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**American Lucifers:
Makers and Masters of the Means of Light, 1750-1900**

A dissertation presented

by

Jeremy Benjamin Zallen

to

The Department of History

in partial fulfillment of the requirements
for the degree of
Doctor of Philosophy
in the subject of
History

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**American Lucifers:
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Abstract

This dissertation examines the social history of Atlantic and American free and unfree labor by focusing on the production and consumption of the means of light from the colonial period to the end of the nineteenth century. Drawing from archives across the country, I reconstruct the ground-level experiences and struggles of the living (and dying) bringers of lights—those American lucifers—and the worlds they made in the process.

I begin by arguing that colonial American deep-sea whaling voyages triggered an Atlantic street lighting revolution radiating from London, while a New England run candles-for-slave(ry) trade helped illuminate and circulate processes caught up in colonial transatlantic sugar slavery. Later, American whale oils lubricated an industrial revolution in cotton manufacturing, overwhelming the capacity of the American fishery to meet the demand for both light and lubrication. Meanwhile, as cotton spindles spun whale oil away from lamps, a new antebellum geography of light and risk emerged.

Next, I turn my analysis inland to turpentine, coal gas, and lard oil. In the urban cores, monopoly gasworks threaded coal-gaslights in and around bourgeois space, while outworking seamstresses labored late into the night with cheap, explosive turpentine lamps. At the peripheries, mixed armies of enslaved and waged laborers worked ever-more dangerous coal mines, planters coerced slaves into tapping remote southern pines, and all struggled to assert some control over this antebellum empire. In the Ohio Valley, meanwhile, a new geography of life and death made and unmade hogs so successfully that wage-worked by-product industries in candles, lard oil, and soap became not only possible, but enormously profitable.

The combined onslaught of Pennsylvania petroleum and the Civil War radically reoriented the possibilities and geographies of light in America. As the war destroyed turpentine camps, whaleships, and southern coal mining, forcing a sharp turn away from slavery, the reservoirs of American light shifted their center of gravity markedly northward and westward. I conclude by exploring the rise of an electric ecology organized around western copper mines and a spectacularly staged future of electrically illuminated spaces that obscured any past (or ongoing) relations between labor, violence, and light.

For Jenny

TABLE OF CONTENTS

List of Illustrations	vii
Acknowledgements	ix
Introduction	1
Chapter One	
“Dragged up Hither from the Bottom of the Sea”: Whales, Whalers, and the Political Worlds of Whale Light	18
Chapter Two	
Piney Lights: Turpentine Slaves, Seamstresses, and Perilous Antebellum Lamps	98
Chapter Three	
Dungeons and Dragons: Slavery, Industry, and Modernity in Coal Mines, Gas Works, and Antebellum Gaslights	182
Chapter Four	
“Prairie Whales”: Hogs, Lard Lights, and the Temporal Politics of Life and Death in the Antebellum Ohio Valley	250
Chapter Five	
The War Between the Lights: Slavery, Industry, and Fossil Fuel Lights in Western Virginia and Pennsylvania during the Civil War	335
Chapter Six	
Staging Lights, Burying Labor: Dreams, Machines, Copper Mines, and the Spatial History of Electric Illumination	412
Conclusion	468
Bibliography	483

ILLUSTRATIONS

MAPS

Map 1	Voyage of the <i>Maria</i> to the first kill	66
Map 2	Complete Voyage of the <i>Maria</i>	85
Map 3	The Turpentine region of North Carolina, showing Grist Camps in operation from 1850-1860	133

FIGURES

Figure 1.1	“The Maria... with a whale alongside cutting in,” drawn by Richard Hixson	26
Figure 1.2	The Packaging – New Bedford whale oil invoice	56
Figure 1.3	“A view of the Maria’s boats, battling a large whale...” drawn by Richard Hixson	74
Figure 2.1	Cutting a box	125
Figure 2.2	Chipping a turpentine face with a round shave	14
Figure 2.3	Dipping (and scraping) and hauling, drawn by Harry Fenn	142
Figure 2.4	“A North Carolina Turpentine Distillery”	165
Figure 2.5	“Charging the Still” and “Spirit Tub—Filling the Barrels,” drawn by Jas. E. Taylor	166
Figure 3.1	“Making Gas”	193
Figure 3.2	“Explosion of Fire-damp”	210
Figure 3.3	Safety lamps	218
Figure 3.4	Gasworks and gasometers	237
Figure 4.1	“The Death Chamber”	321
Figure 4.2	“Hog-Slaughtering and Pork-Packing in Cincinnati,” drawn by H. F. Farny	324

Figure 5.1	Crosscut of the Kanawha River coalfields, drawn by D. T. Ansted	352
Figure 5.2	“Grand Ball Given by the Whales in Honor of the Discovery the Oil Wells in Pennsylvania”	390
Figure 5.3	Pork Packing in the major Mid-western cities 1842-76, by Margaret Walsh	396
Figure 5.4	Candles and Lard Oil Exported from Cincinnati, 1846-1866	399
Figure 6.1	Bijou Light	414
Figure 6.2	Schneider Candle Ad	422
Figure 6.3	Miner’s candlestick and candle	443
Figure 6.4	Miner’s candlestick driven into stull	444
Figure 6.5	<i>Daily Graphic</i> Bijou Representation	455
Figure 6.6	“The Electric Light in Houses—Laying the Tubes for Wires in the Streets of New York”	458

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INTRODUCTION

For God's sake, be economical with your lamps and candles! not a gallon you burn, but at least one drop of man's blood was spilled for it.
— Herman Melville, *Moby Dick*, 1851.

In my dissertation I have tried to take Melville's words of warning seriously by writing a new history of artificial lights that shows clearly the living toll of "progress." What follows will be less a story of how various lighting technologies were invented, and more of how the seas were made "safe" for whalers, how coal mines were dug, and how copper left the ground to be made into wires. Instead of comparing the brightness of tallow and kerosene, I will show how the work done by electric lights to transform one kind of energy into illumination established relationships between and so served to constitute both department store and copper mine (shopper and miner). I hope to tell a story not of the evolution of a series of technologies, but of the relationships among the living (and dying) makers and consumers of lights—those American lucifers—and the worlds they made in the process.¹

In Melville's time, although an expanding geographical separation of production and consumption of the means of light obscured the specific histories of each candle, people were still generally aware that their lights came from the whale fishery, just as today most people are vaguely aware that their bread comes from a wheat farm. But unlike their uneasy ignorance about the origins of their food, Americans today *know* where their lights come from, and that

¹ I take this way of viewing history and society in ecological terms from the field of environmental history. Particularly informative of my work are William Cronon, *Nature's Metropolis: Chicago and the Great West* (New York: W. W. Norton & Company, 1992); Richard White, *The Organic Machine: The Remaking of the Columbia River* (New York: Hill and Wang, 1995); Elliott West, *The Contested Plains: Indians, Goldseekers, and the Rush to Colorado* (Lawrence: University Press of Kansas, 1998); Thomas G. Andrews, *Killing for Coal: America's Deadliest Labor War* (Cambridge: Harvard University Press, 2008).

knowledge is entangled in a number of deeply held convictions about history, the environment, and civilization. Americans *know* that light comes from inventors, switches, light bulbs, and power plants. They also know that the electric light is clear evidence of the present's superiority over the past.

In our electric world, we are everywhere surrounded by glowing lights to which we hardly ever give a second thought. The lights are simply there, as they should be, and they turn on when we flip a small piece of plastic, as it should be. Sometimes we wonder if our lights are as efficient as we'd like, or whether the source of electricity might be polluting the environment. In short, when we think of lights at all, we think of them as parts of a technological system, a kind of man-made nature that is largely static—something to perhaps be tweaked, but never really questioned. What histories these systems have, moreover, exist only to serve as barometers and symbols of human social and technological progress: do we have primitive gas lights or modern incandescent lights? do we resist a fluorescent and LED illuminated future, or do we stubbornly cling to our incandescent Edisonian fossils?

As Melville knew, however, the real history of light is a tale of violence and labor, blood and sweat. This social history of light runs counter to most accounts of the rise of industrial capitalism. Labor historians have focused overwhelmingly on the struggles of artisanal workers to shape and adapt to a changing world while pursuing a working-class version of republicanism. The new history of capitalism, meanwhile, has brought much needed attention to the formation of bourgeois ideology and politics, but has left the subject of labor largely untouched. As the historian Peter Way implores us to recognize, however, these historiographies leave the politics and work of the vast majority of people—the slaves, women, children, native peoples, migrants, and unskilled workers—out of the picture. “It is time,” he writes, “that a more Malthusian rendering of the past should once again be allowed to creep into our interpretations. This does

not mean treating people as victims, but as merely human.”² White male artisans and white male, clerks, merchants, and capitalists were, of course, important, and their experiences and struggles need to be studied, critiqued, and historicized. But by privileging the stories of the already privileged—and I should be clear that in the pages to follow, skilled male wage workers absolutely constituted a privileged class in the production and consumption of the means of light—historians risk rendering a thoroughly distorted picture of the actual power relations that have underpinned the last several centuries of capitalism. My goal is not simply to reveal the dark underside of the history of light, to color in some gaps in an otherwise unchanged story, but to show that this darkness was how light actually happened historically, and that all the progress, all the fortunes that men and women made with these lights depended—discursively, structurally, politically—on keeping the darkness hidden.

The new, brighter, cheaper lights that allowed homes, cities, and factories to push back the night consumed energy accumulated at terrible risk by hundreds of thousands of laborers mobilized to work and die in mines, forest camps, farms, factories, ships, and oil wells. These lucifers, moreover, frequently toiled in the wake of devastating battle—while whalers hunted in waters cleared of pirates by the violence and terror of the British Navy, miners and ranchers trailed U.S. armies west onto the shattered ruins of Mexican and Indian empires. My dissertation will tell just such a political, environmental, and social history of light.

Blinded by the Light

Unfortunately, the Promethean narrative has proved quite resilient when it comes to light. Every so often a popular historian or technology writer decides to publish a new book detailing mankind’s recent crawl out of darkness. Some give attention to alternatives to electric light, or

² Peter Way, *Common Labour: Workers and the Digging of North American Canals, 1780-1860* (New York: Cambridge University Press, 1993), 12.

the ways that some people emerged from the cave more slowly than others. Some even mention the kinds of labors and fuels necessary to make or power a particular light technology. Almost invariably, however, these works are tales of invention and innovation, and (less commonly) of use. The physical lights themselves, paradoxically, remain passive objects, while as abstract technologies *the* kerosene lamp, *the* electric light are treated as prime historical movers. Progress is made inescapable, energy is abstracted, labor compartmentalized, technologies reified, and production almost entirely ignored.³

Professional historians and technology theorists have spent decades trying to find a way out of this myth. While some of the work has been excellent, much remains to be done. When addressing the specific history of artificial light, either directly or in passing, these scholars have encountered many of the same difficulties and reproduced many of the same mistakes as those outside the academy. Many of the best academic histories of artificial light and night have focused on culture and experience. Wolfgang Schivelbusch's *Disenchanted Night* still stands as an indispensable account of the profound effects that the "industrialization of light" in the nineteenth century had on practices like reading and nightlife, architecture, crime, and commercial culture. Yet Schivelbusch, like the other brilliant cultural and architectural historians of light and night, treats lights much like he would a wall or a window, as design features rather

³ The list of such works is a long one, and I should say that many are quite useful and deserve recognition. For some examples of the promethean mythologizing see: Matthew Luckiesh, *Torch of Civilization: The Story of Man's Conquest of Darkness* (New York: G. P. Putnam's Sons, 1940); Ralph A Richardson and General Motors Corporation, *Optics and Wheels: A story of Lighting from the Primitive Torch to the Sealed Beam Headlamp* (Detroit: General Motors Corporation, 1940); F. W Robins, *The Story of the Lamp (and the Candle)* (New York: Oxford University Press, 1939). For some comprehensive illustrated chronicles of the history of lighting technologies and use see: Brian Bowers, *Lengthening the Day: A History of Lighting Technology* (New York: Oxford University Press, 1998); Maureen Dillon, *Artificial Sunshine: A Social History of Domestic Lighting* (London: National Trust, 2002); William T O'Dea, *The Social History of Lighting* (London: Routledge and Paul, 1958). For recent examples of good popular histories that are trying to reevaluate whether all this light has been as inevitable or positive as we thought, see: Jane Brox, *Brilliant: The Evolution of Artificial Light* (Boston: Houghton Mifflin Harcourt, 2010); Alfred W. Crosby, *Children of the Sun: A History of Humanity's Unappeasable Appetite for Energy* (New York: W. W. Norton & Company, 2006); Jill Jonnes, *Empires of Light: Edison, Tesla, Westinghouse, and the Race to Electrify the World* (New York: Random House, 2003).

than processes of energy transformation. The social and environmental stories of how making and powering those “industrial” lights transformed landscapes and reorganized labor and life in mines, factories, and cities have been left untold.⁴

David Nye, one of the best known historians of energy and technology, has written a history of electrification in the United States, in which he takes as his underlying premise the notion that “in the United States electrification was not a ‘thing’ that came from outside society and had an ‘impact’; rather, it was an internal development shaped by its social context. Put another way, each technology is an extension of human lives: someone makes it, someone owns it, some oppose it, many use it, and all interpret it.”⁵ That technologies are socially mediated processes is an invaluable insight, for which we owe a substantial debt to historians of technology like Nye.⁶ However, there are limitations to this formulation. While Nye provides an excellent account of the consumption and expansion of electrical systems, repeatedly insisting that variations in place and time demonstrate how individuals and societies were free to make cultural choices about their technologies, the technologies themselves remain theorized as neutral, passive objects to be utilized by liberal subjects. Beyond the ideological implications of such analysis,

⁴ Wolfgang Schivelbusch, *Disenchanted Night: The Industrialization of Light in the Nineteenth Century* (Berkeley: University of California Press, 1995). For additional excellent considerations of the history of night, space, culture and illumination see: Murray Melbin, *Night as Frontier: Colonizing the World after Dark* (New York: Free Press, 1987); John A. Jakle, *City Lights: Illuminating the American Night* (Baltimore: Johns Hopkins University Press, 2001); A. Roger Ekirch, *At Day's Close: Night in Times Past* (New York: W. W. Norton & Company, 2005); Peter C. Baldwin, *In the Watches of the Night: Life in the Nocturnal City, 1820-1930* (Chicago: University of Chicago Press, 2012).

⁵ David E. Nye, *Electrifying America: Social Meanings of a New Technology, 1880-1940* (Cambridge: MIT Press, 1992), ix.

⁶ For other important works and discussions on the history of technology see: Merritt Roe Smith and Leo Marx, *Does Technology Drive History? The Dilemma of Technological Determinism* (Cambridge: MIT Press, 1994); David Edgerton, *The Shock of the Old: Technology and Global History since 1900* (New York: Oxford University Press, 2006); Thomas P. Hughes, *Human-Built World: How to Think about Technology and Culture* (Chicago: University of Chicago Press, 2005); Thomas P. Hughes, *Networks of Power: Electrification in Western Society, 1880-1930* (Baltimore: Johns Hopkins University Press, 1993). Timothy J. LeCain recent history of open-pit copper mining, *Mass Destruction: The Men and Giant Mines that Wired America and Scarred the Planet* (New Brunswick: Rutgers University Press, 2009), has also been an indispensable work for thinking about the historical intersections of social, environmental, and technological processes. What I hope to contribute to the framework provided by the theory of “mass destruction” is to more thoroughly theorize the place and politics of labor.

there is a narrative consequence as well. While an improvement over seeing technologies as transhistorical forces, the problem of considering technologies primarily from a frame of “use” is that it invariably abstracts technologies from their particular historical contexts by treating them as reified constants, which different societies at different times have chosen to use in different ways. Even sophisticated historical studies like Nye’s tend to see technologies as things rather than relationships or processes of energy and work, so that tools and machines seems to spring magically, if sometimes awkwardly, into history from some vaguely referenced factory or laboratory.

Many cultural historians agree with Nye that the history of light is a liberal one, but following Foucault and Bruno Latour they try to explain (rather than presume) the formation of liberal subjects. They argue the modern spaces of the city emerged through a self-organized process of negotiation that had the unplanned (although not always unintended) result of forming liberal subjects who would police each other and themselves within a patchwork of private and public spaces of varying “visibility.”⁷ Yet again, even Chris Otter, whose thoughtful and carefully researched book *The Victorian Eye* deals with actual lights and lighting systems is unable to look behind the lamps to see what else their making and operation was doing besides emitting photons to be experienced and contested. History and power are thus externalized, not embodied in the lights.

Otter is correct that Foucault and Scott are both too abstract and hugely overestimate the panoptic tendencies of “the state” or a modern liberal society. Yet because he cannot see the life-consuming and community-shattering coal mines or the uprooted armies of “free” migrant copper and coal miners as connected to his “political” history of light and vision in the Victorian

⁷ See especially Jonathan Crary, “Techniques of the Observer,” *October* 45 (Summer 1988): 3-35; Chris Otter, *The Victorian Eye: A Political History of Light and Vision in Britain, 1800-1910* (Chicago: University of Chicago Press, 2008); Patrick Joyce, *The Rule of Freedom: Liberalism and the Modern City* (New York: Verso, 2003).

city, Otter can safely say that lighting in nineteenth-century London was constitutive of “the multiple, superimposed vision networks of nineteenth-century Britain,” which, he argues, “can be seen as broadly liberal, in that they were invariably designed with certain aspects of human freedom in mind.”⁸ Miners, railroad and canal builders, and men shoveling coal in the searing dangerous coal-gas retorts whose everyday movements and labors were circumscribed by elaborate strategies of exploitation and dependency to keep profits flowing and liberal cities glowing, would hardly have recognized their conditions as having been designed with “human freedom in mind.”

Why is it so difficult to see production and consumption as part of a single history of technology? The prevailing myth of light depends upon this artificial distinction, as does our view of “natural” and “built” environments as static backdrops to real history. My dissertation will thus unite production and consumption into a coherent narrative that permits contests and power struggles—will apply the methodologies of environmental history (which emphasize work, life, energy, and relationships) to the unnatural world of artificial technologies.

Questions of Space

The history of the last two centuries, perhaps more than for any other period, has been a history of radically changing space. Like Richard White, “I don’t want to be so simplistic as to say that if space is the question then movement is the answer, but I fear that I am nearly that simple.”⁹ Movement across continents and oceans accelerated to degrees never before seen. Millions of people have also made social journeys through space from country to city, from farmer to worker, from village to plantation, from freedom to slavery, from civilization to

⁸ Otter, *The Victorian Eye*, 258.

⁹ Richard White, “What is Spatial History?” *Spatial History Lab* (Stanford University, February 1, 2010), pp. 2-3.

extinction, from nomads to reservation. And at the core of these mass movements and exterminations lay the intertwined driving forces of capitalism and technics—what Lewis Mumford defined as the mechanization of society around particular energy complexes such as water-wood (cotechnic), coal-iron (paleotechnic), and electricity-alloy (neotechnic).¹⁰

Now, none of this should be terribly surprising. We are routinely reminded that railroads radically transformed space and society in the nineteenth century, and that the modern world was built on the backs of masses of uprooted and unfree workers. However, there is at least one important whiggish narrative that has survived these revisions rather unscathed, that is, the story of technological progress, and more specifically the history of artificial light. Not only has Edison's electric light bulb come to symbolize a steady culmination of the march of civilization, the story of light has been seen as almost entirely self-contained and unproblematic.

And if the story of the last two hundred years or so has been about revolutions in space, it is time we recognized the critical role played by artificial light in the production of those changing spaces. While new ships, railroads, steamships, and canals may have transformed the relationships between places, what Lefebvre and Harvey call relative space, changes in the production, consumption, and control over the means of artificial light remade the lived spaces of home, workshop, city, and leisure.¹¹ The street-space produced by a lamp at night was the product of the movement of photons, whalers, whales, whale oil, and lamplighters. Space is continually reproduced and that means spatial histories must track the ever-shifting patterns of movement of people, plants, animals, energy, and goods.

¹⁰ For the foundational text on the study of technics see Lewis Mumford, *Technics and Civilization*, Reprint ([1934] Chicago: University of Chicago Press, 2010).

¹¹ David Harvey, *Justice, Nature and the Geography of Difference* (Cambridge: Blackwell, 1996); Henri Lefebvre, *The Production of Space*, trans. Donald Nicholson-Smith (Cambridge: Blackwell, 1991).

While new kinds of sailing ships were stitching together an Atlantic civilization, new kinds of glass were making homes brighter and longer work days cheaper and more possible. Whale oil from every ocean flowed through and transformed New England. Pennsylvania petroleum was channeled into hundreds of miles of pipes, rail, and ship, flooding and helping to multiply the number and use of lamps while fueling the rise of the largest monopoly in American history, the energy and infrastructural corporate giant, Standard Oil. Coal-gas and then electricity transformed not only the amount of light available but relations of capital and consumer in the form of centralized utilities that operated as city-wide industrial light factories. Tallow candles never disappeared during this period, but they too were increasingly produced in factories tied in to a massive ranching and railroad geography and less in the home from animals raised locally. In parks, streets, lighthouses, and public buildings state agents wielded new-found brilliance powered and shaped by vast new frontiers of energy and capital accumulation to assert (however imperfectly and contested) visions of state power and social order.

These frontiers of accumulation, moreover, must be understood as produced, not discovered spaces. Three and four year-long whaling voyages into the open blue would have been far too risky to be profitable before the British Navy violently eliminated pirates, privateers, and rival empires from the seas during the eighteenth and nineteenth centuries. Mid-Atlantic coal and oil were captured during colonial times, but lay unknown and buried until armies of laborers dug canals, mines, and built rail to transform a region into a frontier of energy extraction. Ranchers and cattle were penned in and limited until U.S. soldiers and settlers broke Indian powers and exterminated the buffalo on the Great Plains, turning a series of borderlands into a frontier. The history of light in America has always been braided with military violence, dispossession, and the making of geographies of extraction.

Webs of Energy

To properly frame this kind of narrative, to carefully and precisely map the interrelated production of spaces, energy transformations, and the full range of contests around light, will require more than stitching together a labor history with an environmental and a consumer history. We need a new way of thinking about energy, life, work, space, power, and culture that uses a common vocabulary and identifies real material relations. Energy is the perfect place to start. At its most basic, light is a process of energy transformation. Whether it is the result of a flame consuming carbon and oxygen to superheat gas and thereby emit photons (light), or the process of incandescence—in which a material is excited by direct heat or electrical resistance, causing it to glow brightly—light is always a process requiring particular materials, sources of energy, and environments in which to take place.

Energy is important to history because it is impossible to understand material power relations without it. As Richard White so aptly puts it, to “be powerful is to be able to accomplish things, to be able to turn the energy and work of nature and humans to your own purposes. ... Human labor would later make the Dalles and the Cascades the sites of dams that produced energy—power; they were, however, long before this, sites at which humans contested over social power—the ability to gain advantage from the labor of others.”¹² Yet this is only part of the story. People fought over access to the energies of the river, but they did not make or produce the river. Energy is not restricted to kinetic forms, it is manifest in all matter and life. The issue is in figuring out ways of accessing and using that energy, which often involves considerable imaginative leaps. As Elliot West writes, all “organisms draw on that energy, convert it, and use it in order to live. As energy is captured and set to a purpose, it becomes power. ... Simply

¹² White, *The Organic Machine*, 14.

rearranging the flow of energy has one set of results. Another set comes from using the power that energy gives. The isolated act of making and controlling fire, for instance, has changed the relationship among people, wood, and the many creatures involved with both.”¹³ For us to understand the energy flows and contests enveloping light requires that we look at energy in terms of webs of exchange, transformation, and recombination. For the energy of a Pacific whale to be made to do work in producing light in a North Atlantic lighthouse, a much longer, meandering, and fragile set of journeys and transformations had to take place than was the case for using the kinetic energy of the Columbia River.

The simplest, most straightforward way to recognize and envision these kinds of webs is to think ecologically more seriously and frequently than we are accustomed to doing. This means asking some familiar life-centered questions about things or processes that we normally would consider inanimate—for instance a candle, a ship, or a light bulb. Take a spermaceti (sperm whale) candle. When sitting unlit in a candlestick, it hardly could be thought of as in any way living, but if the wick were lit, that would be a different story. Focus on the flickering, dancing flame. If not properly tended the flame could die, or worse it could spread to curtain, furniture, house, city—it could become an uncontrolled fire, could reproduce itself. A maid or housewife may have lit the candle, but the flame now existed independently, was doing work on its own. The flame was consuming whale fat, cotton wick, and oxygen to produce heat and light. But more historically, the burning candle accessed, combined, and consumed the work and energies of Mississippi cotton plantations, New England cotton factories, and Pacific whaling fleets. The solar energy flowing through leaf to cotton fibers, from plankton to whale, together with the labor

¹³ West, *The Contested Plains*, xxi

of slaves, whalers, spinners, and candlemakers became accessible through the candle flame, were transformed into illumination.

Indeed, the critical issue was not only the specific work that a ship, a light, or a horse could do for the humans that controlled them, it was also the amounts and kinds of energy that a given technology allowed humans to access. “Every living tool,” and here we might want to imagine this refers to a candle or light bulb, “like its owner, must take energy from something else in order to do its work.” This could be digested grass, or it could be whale blubber or coal-fired electricity. “People tame and direct an animal’s power,” again, try mentally substituting a machine, “but they are really using the animal’s ability to acquire energy. It follows that an owner must pay at least as much attention to that energy source—to the animal’s food—as he does to the creature itself. The crucial relationship, in short, is not so much between people and their animals. It is between people and the things their animals eat.”¹⁴

Suddenly, a whole new set of questions about technologies seems to surface. They are, however, old questions. Before modern scientific knowledge of technology reified the divide between nature and culture, Marx, the supposed promethean utilitarian, made a remarkably similar argument to West’s. Pointing out that Darwin has shown the importance of the evolution of the natural organs of life, Marx asked, “Does not the history of the productive organs of man in society, of organs that are the material basis of every particular organization of society, deserve equal attention? ... Technology reveals the active relation of man to nature, the direct process of

¹⁴ West, *The Contested Plains*, 50-51. My project, which seeks to tell the story of not just one, but several human-technology relationships differs from West’s treatment of a single energy relationship between horses and Indians. I am interested in how a diverse ecology of relationships and artificial organisms (lights) doing similar work (lighting) became increasingly abstracted and interchangeable over the course of the nineteenth century as illuminants. This demands that I examine the work that lights did at least as critically as what they consumed and how they were produced. They may not have competed for the same resources, but each of these relationships sought to transform and inhabit an increasingly demarcated social niche as lights. That electric lights emerged as the dominant species, moreover, was as much a story of shifting ecologies as it was any innate electrical superiority.

the production of his life, and thereby it also lays bare the process of the production of the social relations of his life, and the mental conceptions that flow from those relations.”¹⁵ If, as West and Marx most brilliantly argue, we should be asking not just what lights did, but what energy relationships did they make possible, we have made the first and most important intellectual step toward reintegrating the production and consumption of light.

A spermaceti candle, when lit, formed an energy relationship between the accumulated energy of ocean life in the body of a whale and the reading room of a New Bedford manor. A coal-gas light opened a conduit to the buried energy of billions of days-worth of ancient sunlight; an electric light might do the same by a different path, or it might bring the energy of a powerful river to a cotton factory on its midnight shift. But while this conduit idea is certainly true, it is also potentially problematic, and probably misleading. Whereas the path from grass to horse is rather simple, and usually uncontested once begun (parasites being an exception), the same can hardly be said of the paths from whale to candle or Pennsylvania petroleum to a kerosene lantern. To deal with these complexities, we will need to think even harder about the relationship between work and life.

While horses contained within themselves both the means of life and of reproduction, and the means of biological work, candles and lamps contained only the means of work. Their bodies had to be made by humans (reproduction) and their food had to be gathered and processed by humans (life). Unlike horses, the life-cycles and vital organs of candles were splayed out across oceans and continents, disaggregated and divided in space and time. Where a horse ate grass and incorporated that food into its body to later be converted to do work, whalers in one part of the world captured and digested a whale that would later be incorporated into a candle thousands of

¹⁵ Karl Marx, *Capital* as quoted in John Bellamy Foster, *Marx's Ecology: Materialism and Nature* (New York: Monthly Review Press, 2000), 200.

miles and perhaps years distant, which would then be able to do work only when another human “brought it to life” by lighting its wick. Each of these spaces, these organs of light, moreover, were socially produced from very different environments and subject to contests, struggles, and dissolutions that would never (and could never) similarly affect the biology of a horse.

From a narrative standpoint, there is no way I can write a total history of lights from 1750 to 1900—my project demands that I carefully choose and organize the stories I will tell. I am decidedly not interested in writing a history of invention or of every use or mention of lights in America. My aim is rather to tell a story, or series of stories, about the relationships that the making and using of lights in America established and the dreamed realities that both shaped and were shaped by these material webs. To that end, I will focus my narratives around the men and women who labored and lived closest to the core energy and power relations of each lighting ecology I explore.

Dissertation Outline

My dissertation examines the spatial and social relations of Atlantic and American slavery, free labor, and capital by focusing on the production and consumption of the means of light from the colonial period to the end of the nineteenth century. Drawing from archives across the country, I reconstruct the ground-level experiences and struggles of the living (and dying) bringers of lights—those American lucifers—and the worlds they made in the process. The result is a new history of space, slavery, and capitalism that shows clearly the coercive, often hidden engines of exploitation and accumulation that have driven over two centuries of social “progress” in illumination.

Beginning with the rise of the American whale fishery in the 1750s my first chapter looks at the violent accumulation and circulation of energy embodied in sperm and right whales. I

argue that American deep-sea whaling voyages first triggered a street lighting revolution that radiated from London to Europe and America, while a New England run trade in spermaceti candles, whale oil, slaves, sugar, and rum helped illuminate and circulate the people, products, and work processes caught up in colonial transatlantic sugar slavery. Later, American whale oils lubricated an industrial revolution in cotton manufacturing, in part founded on capital accumulated in the candles-for-slave(ry) trade, while fugitive slaves and free blacks carved out a geography of freedom in the globe-spanning Quaker-run fishery. As these entwined revolutions in night and cotton intensified in the antebellum period, they overwhelmed the capacity of the American fishery to meet the demand for both light and lubrication, even as ship masters drove whalemens on harder and longer voyages for less and less pay. And as cotton spindles spun whale oil away from lamps, a new antebellum geography of light and risk emerged.

Outside the bourgeois gaslit cores, in the urban peripheries of antebellum tenements, domestic workers and outworking seamstresses labored late into the night with cheap, explosive turpentine lamps. The second chapter of the dissertation explores how the gendered temporal and spatial politics of the ready-made clothing revolution were made through a new slave-produced illuminant called “camphene.” A liquid mixture of spirits of turpentine and high-proof alcohol, camphene connected outworking seamstresses in New York tenements with the North Carolina slaves laboring in the political ecology of remote forest turpentine camps to accumulate nearly every drop of turpentine in the United States. Through the antebellum making and using of piney light, white women working in the home and black men tapping pines far from plantations endured terrible violence and danger—risks rendered spatially, temporally, and culturally invisible—to underwrite the worlds of Northern and Southern white men. I attempt to pull this antebellum relation out of the shadows by exploring the political worlds of freedom, slavery, and gender made through piney light.

Chapter three explores the industrial spatial politics and competing regimes of antebellum modernities created through the making of coal gaslight. While seamstresses and turpentine slaves dipped, distilled, burned, and stitched themselves together across urban and woody frontiers, in the urban cores, monopoly gasworks threaded coal-gaslights protectively in and around bourgeois space. In Northern, Southern, and Western cities, new ruling classes debated the role and relationships of states, commerce, industry, and slavery surrounding gaslight. For boosters in New Orleans and other Southern cities, slavery, especially industrial slavery, was the *sine qua non* of their gaslit modernity. For Northern industrial heralds, it was the automation and conspicuous absence (or invisibility) of labor that made gaslight systems at once so attractive and so contentious. But it was in the built environments of production where slavery, freedom, and industry were most violently configured. At the peripheries of processes of gaslight, frontiers of bituminous (gas) coal accumulation multiplied deep underground. And in the eastern seaboard, that meant Richmond mines. There, planters and industrial slaveholders compelled mixed armies of slaves and wage laborers to work ever-more dangerous coal mines, while all struggled to assert some control over this antebellum empire.

Chapter four explores how, meanwhile, in the Ohio Valley, a pork industry emerged in the geographic interstices of slavery and free white labor to propel millions of hogs from farms and cornfields into a seasonal constellation of industrial death complexes centered in Cincinnati. This geography of life and death unmade hogs so successfully that time-disciplined, wage-worked by-product industries in candles, lard oil, and soap became not only possible, but enormously profitable. At the heart of the three chapters composing this section are questions of space, time, gender, race, and coercion. I argue that not only did frontiers make cities, and cities make frontiers, but that slaves, seamstresses, and rural hogs entangled in proprietary relationships

worked in alternative, hidden geographies made around antebellum lights to produce the public industrial and democratic worlds of white men.

In the fifth chapter, I examine how the combined onslaught of Pennsylvania petroleum and the Civil War radically reoriented and foreclosed the possibilities and geographies of light in North America. As military clashes interrupted and destroyed turpentine camps, whaleships, and southern coal mining, the reservoirs of American light shifted their center of gravity markedly northward and westward as the foundations for industrial slavery were destroyed. A period of widely increased access to illuminants, it was also a time of deepening monopoly control over the means of light. Here I explore the centrality of political economy and organized violence to any true understanding of the histories of labor, energy, and technology.

In my final chapter, I explore the rise of an electric ecology organized around western copper mines and a spectacularly staged, industry-heralded future of electrically illuminated spaces that denied and obscured any past (or ongoing) relations between labor, violence, and light. The stories we have told about light, the process perhaps most closely identified with a heroic narrative of scientific progress, were largely formed and consolidated in this final period. What began as an advertising strategy by electric boosters like Thomas Edison has clouded historical inquiry ever since, making the violent, coercive, racialized labor regimes created through and for light nearly impossible to see. This final chapter attempts to demystify electricity so that the subjects of the five previous chapters can, too, be properly understood as central processes in the history of light, modernity, and the industrial revolution.

CHAPTER ONE

“Dragged up Hither from the Bottom of the Sea”: Whales, Whalers, and the Political Worlds of Whale Light

It is a land of oil, true enough: ... nowhere in all America will you find more patrician-like houses; parks and gardens more opulent, than in New Bedford. Whence came they? how planted upon this once scraggy scoria of a country? ... Yes; all these brave houses and flowery gardens came from the Atlantic, Pacific, and Indian oceans. One and all, they were harpooned and dragged up hither from the bottom of the sea. —Herman Melville, *Moby Dick*, 1851

As the last sea-scattered rays of the setting sun filtered through the greasy glass into his high perch, Jonathan Bruce began a ritual he had repeated nearly every evening for the last twenty years. Turning from the dirty lighthouse window, Bruce set to work on the lamps. Using fire carefully kept alive during the day, he caught the oil-soaked wicks and was soon bathed in a warm lens-focused light that transformed the room into one of the brighter spaces in all the night world. Of course, that light was not meant for him. From atop their stone tower, the now greedily glowing lamps cast their radiance for miles around, dim by the time it reached other eyes, but nonetheless a beacon in the night for any sailor passing near Boston Harbor. Settling in amongst his brilliant but mute companions, Jonathan Bruce prepared, that September evening in 1832, to stand guard over the lamps and the tower in which they shone—for he was the keeper of Boston’s lighthouse, and the steady trade of the maritime city depended on him.¹

Across the harbor in Boston, as the first light from the lighthouse reached the docks, Richard Hixson may have glanced out at the sudden gleam as he shouldered his bag and

¹ Fitz-Henry Smith, *The Story of Boston Light: With Some Account of the Beacons in Boston Harbor* (Boston: Priv. print, 1911), 66; Dennis L. Noble, *Lighthouses & Keepers: The U.S. Lighthouse Service and its Legacy* (Annapolis: Naval Institute Press, 1997), 1-27; William T. O’Dea, *The Social History of Lighting* (New York: Macmillan Company, 1958), 199-211; Jane Brox, *Brilliant: The Evolution of Artificial Light* (New York: Mariner Books, 2011), 48-57.

marched up the gangway of a sloop by the name of *Nantuck*. Or perhaps it would be the gridded glow that drew Hixson's gaze, as smaller versions of Bruce's lamps were brought to life by lamplighters all across the city. More likely, Hixson gave little thought or attention to either sets of lamps, busy as he was with preparing to ship out. Consciously or not, however, Hixson's actions were as shaped by these lights as Bruce's were. Even as street lamps and lighthouses produced the illuminated terrain through which commodities flowed and property was secured, they did so only by consuming work and energy accumulated across spaces far removed from those flames and their keepers. Hixson was beginning a journey to just such a frontier of luminous accumulation. He was to become a whaler.²

When, later that night, the Nantucket-bound *Nantuck* sailed through the light streaming out from Bruce's sperm-oil lamps, they were two light-bringers passing in the night—each actively engaged in producing the other. Hixson and Bruce were counterparts bound together in webs of whale light, the one to accumulate its cetaceous means, the other to channel its consumption into a beacon in the dark. By the time Hixson next passed the lighthouse on his way home to his farm in Sharon, Massachusetts in 1836, Bruce would be gone and Hixson no longer a whaler. Briefly, however, they had both been bringers of light. They had both been American lucifers.

What follows is the story of this relationship, of making lights, and wielding lights, of worlds hunted, harpooned, and dragged up from the bottom of the sea. It is a history of dark connections between luminous spaces, of the ties among whales, sailors, ships, and lamps, and how these webs of light ultimately unraveled under the weight of the very industrial and imperial forces they had unleashed. Behind these lights lay weeks stretching into years of tedious drifting

² Richard W. Hixson, "Journal of the Voyage of the 'Maria,' " Nantucket, September 14, 1832, F 6870.53.20, Daniel B. Fearing Logbook Collection, 1816-1882, Houghton Library, Harvard University.

punctuated by bouts of intense danger and activity, of boiling blubber and shattered boats, stormed-tossed sailors and the slaying of leviathans. Before their luminescence lay sugar and cotton, slaves and wage workers, thieves and police, fire and war. The Quaker masters of the New England whale fishery turned the dangerous, prolonged labor of American whalers and the gruesomely captured blubber of whales into fortunes for themselves and a new Atlantic order for others. They did so by driving their hooks into the sinews of the Atlantic world, injecting whale oils into critical junctures in four processes at the heart of Atlantic political economy—the trans-Atlantic slave trade, the manufacture and trade of sugar, the making of the urban poor into the working classes, and the spinning of American cotton into factory textiles. Although it hardly sounded grand, the illuminated and lubricated spaces of Atlantic commerce, industry, and public order were, in fact, emerging through webs of work, energy, and butchered fat spinning outwards from the violent application of harpoons.

First, a substantial number of the spermaceti candles manufactured in New England were exchanged at West African slave forts for captives to be shipped and sold into West Indian sugar slavery.³ Following the horrific labor of cane cultivation, if New World slaves survived the harvest, they would once again encounter the presence of the fishery in the continuous operations of sugar mills and boiling houses. There, planters employed whale oil to illuminate the labor processes and so made the necessary overnight manufacture of sugar possible and more efficient.⁴

³ Richard C. Kugler, “The Whale Oil Trade: 1750-1775,” *Old Dartmouth Historical Sketch* 79 (New Bedford, 1980); Ronald Bailey, “The Slave(ry) Trade and the Development of Capitalism in the United States: The Textile Industry in New England,” *Social Science History* 14 (Autumn 1990): 375, 381-82, 386, 392-93; Ronald Bailey, “The Other Side of Slavery: Black Labor, Cotton, and Textile Industrialization in Great Britain and the United States,” *Agricultural History* 68 (Spring 1994): 46-47; Daniel Sohn, “The Other Side of the Story,” *Rushlight* 72 (June 2006): 6-12; Richard Ellis, *Men and Whales* (New York: Lyons Press, 1991), 144; Eric Jay Dolin, *Leviathan: The History of Whaling in America* (New York: W. W. Norton & Co., 2007), 113, 225-26.

⁴ The methods sugar planters used to illuminate night work were only rarely mentioned by contemporaries, and still less by historians. For evidence that planters used whale oil lamps to light the night-shifts in boiling houses, see: Thomas Roughley, *The Jamaica Planter's Guide; or, A System for Planting and Managing a Sugar Estate, or Other Plantations in the Island, and throughout the British West Indies in General* (London: Longman, Hurst, Rees, Orme, and Brown, 1823),

Then, New England merchants like the Brown family of Providence and the Cabots of Boston connected West Indian sugar plantations with Boston rum industries by carrying south cargos of cod, candles, and oil, and returning north with holds filled with sugar and molasses.⁵ New England oil merchants like Thomas and John Hancock and William Rotch, meanwhile, grew rich shipping and selling whale oil to cities like London, which were rapidly building street lamps. American whale oil thus allied with city governments in their struggles to police and colonize night spaces increasingly populated by unruly apprentices, journeymen, sailors, porters, and paupers, and to make these groups behave more like a working class.⁶ By the same token, it was only with the profits and capital accumulated through what the historian Ronald Bailey has called the “slave(ry) trade” in slaves, spermaceti candles, and rum that New England and Liverpool merchants were able to make use of that working class and launch an industrial

199-200; Thomas Thistlewood, Diary, Friday, February 17, 1769, in *In Miserable Slavery: Thomas Thistlewood in Jamaica, 1750-86*, ed. Douglas G. Hall (Kingston: University of the West Indies Press, 1999), 216; Edward Long, *The History of Jamaica*, vol. I (London: T. Lowndes, 1774), 462, 492; Long, *The History of Jamaica*, vol. II (London: T. Lowndes, 1774), 168; Dalby Thomas, “An Historical Account of the Rise and Growth of the West-Indian Colonies,” *Harleian Miscellany* 2 (London: T. Osborne, 1774), 349; *Abridgement of the Minutes of the Evidence, Taken before a Select Committee of the Whole House, to Whom it was Referred to Consider of the Slave-Trade*, no. 3 (1790): 135; James Clark, “History of an Aneurism of the Crural Artery, with Singular Circumstances,” *Medical and Philosophical Commentaries* 13 (1788): 327; Santiago Dod, “Stray Glimpses of the Cuban Sugar Industry,” pt. 8, *Louisiana Planter and Sugar Manufacturer* 29 (August 9, 1902): 93. For discussions and descriptions of night work in sugar plantations more generally, see: James Ramsay, *An Essay on the Treatment and Conversion of African Slaves in the British Sugar Colonies* (London: James Phillips, 1784), 75-77; *An Abstract of the Evidence Delivered before a Select Committee of the House of Commons, in the Years 1790 and 1791; on the Part of the Petitioners for the Abolition of the Slave Trade* (Society in Newcastle for Promoting the Abolition of the Slave-trade, 1791), 56-57; *Protectors of Slaves Reports*, House of Commons, June 12, 1829, 17-21; James Stephen, *The Slavery of the British West India Colonies*, vol. II (London: Saunders and Benning, 1830), 137-60, 174-80; *Report from the Select Committee on the Extinction of Slavery throughout the British Dominions*, House of Commons, August 11, 1832, 33-39; Sidney W. Mintz, *Sweetness and Power: The Place of Sugar in Modern History* (New York: Penguin Books, 1985), 46-52; Richard Follett, *The Sugar Masters: Planters and Slaves in Louisiana’s Cane World, 1820-1860* (Baton Rouge: Louisiana State University Press, 2005), 106-7.

⁵ Kugler, “The Whale Oil Trade”; Bailey, “The Slave(ry) Trade and the Development of Capitalism in the United States,” 373-414; Bailey, “The Other Side of Slavery,” 35-50; Sohn, “The Other Side of the Story,” 6-12; Ellis, *Men and Whales*, 144; Dolin, *Leviathan*, 113.

⁶ Kugler, “The Whale Oil Trade”; Dolin, *Leviathan*, 109-135; A. Roger Ekirch, *At Day’s Close: Night in Times Past* (New York: W. W. Norton & Co., 2005), 67-74, 330-337; Jane Brox, *Brilliant: The Evolution of Artificial Light* (Boston: Mariner Books, 2010), 20-57; J. M. Beattie, *Policing and Punishment in London, 1660-1750: Urban Crime and the Limits of Terror* (New York: Oxford University Press, 2001), 221-225; Peter Linebaugh, *The London Hanged: Crime and Civil Society in the Eighteenth Century*, 2nd ed. (London: Verso, 2003).

revolution in textiles.⁷ But it was not the end of the story. The factory spindles around which turned the exploitation of Lancaster (and New England) mill hands and American cotton slaves depended on the lightweight sperm oil they continually required for lubrication.⁸ And as these entwined revolutions in night and cotton intensified in the antebellum decades, they eventually overwhelmed the capacity of the American fishery to meet the demand for both light and lubrication, even as ship masters drove whalers on harder and longer voyages for less and less pay.

This chapter tells the story of how the social politics of Atlantic cities, plantations, and factories reverberated back and forth through the worlds of work the whalers made—how the Atlantic struggles converging in American whaleships and around American whale oil continually encountered and confronted the internal shipboard struggles of owners, officers, and crews—in a process of creative friction that, over the course of more than a century, transformed the American whale fishery into a globally significant luminous industry and then unmade it as a dark hunt for industrial lubrication. It was a process, finally, that began as it ended, deep at sea in the whaleships worked by men like Richard Hixson.

To Catch a Whale

March 2, 1833, off the coast of Chile, the “watches employed as yesterday.” It had been six months since Richard Hixson left his farm in Sharon, Massachusetts to go hunting after oil,

⁷ Bailey, “The Slave(ry) Trade and the Development of Capitalism in the United States,” 373-414; Bailey, “The Other Side of Slavery,” 35-50. For some other works challenging and critiquing the Marxist inability to see slavery as central to the process of “primitive accumulation” and to the ongoing production of surplus value in the eighteenth and nineteenth centuries see: Eric Williams, *Capitalism & Slavery* (1944; Chapel Hill: University of North Carolina Press, 1994); Stephen Hymer, “Robinson Crusoe and the Secret of Primitive Accumulation,” *Monthly Review*, September 1971 (reprint, September 2011); Cedric J. Robinson, *Black Marxism: The Making of the Black Radical Tradition* (1983; Chapel Hill: University of North Carolina Press, 2000).

⁸ Lance E. Davis, Robert E. Gallman, and Karin Gleiter, *In Pursuit of Leviathan: Technology, Institutions, Productivity, and Profits in American Whaling, 1816-1906*, (Chicago: University of Chicago Press, 1997), 342-368.

and he still hadn't encountered a single sperm whale. This was not uncommon. Just getting to the whaling grounds took months, and once there, whalers' time was usually dominated by sailing, repairing, and procuring food, not to mention finding whales to hunt at all. Going after whales was the exception, not the rule. But that March morning, the men of the *Maria* would finally have a chance to do what they had sailed 10,000 miles to accomplish. For the first time in the voyage, "11 o'clock A.M. saw a sperm whale on our weather bow distant 1½ mile, lower'd boats, and rowed for him." In about an hour they pulled even with the whale and the "waste [waist] boat made fast." Very soon the "Stabboard boat," (Hixson's) "got 2 irons into the monster of the deep, and after the lapse of another hour the whale lay a motionless lump on the top of the water." From the perspective of his journal entry, Hixson remarked that it "was to me an interesting scene, to be engaged for the first time in fighting with and killing a large whale, he truly made the deep boil like a pot."

Killing the whale, however, was only the first step in transforming it into oil. Unfortunately for the whalers, the means of that transformation lay miles away back on the ship. Thrill done, now came the long haul of a fifty-ton carcass, and Hixson could forget help from the other boats: with the "Signal from the ship that more whale are in sight, the waste & Labbord boats went in pursuit, whilst the Stabbord boat (mine) towed the whale to ship." Muscles and oars straining against the water, Hixson and his boat crew steadily drew their prize closer, and by "5 P.M. the boats all come in alongside ship [having failed to catch any other whales, and] all hands getting ready to cut him in." It had taken six months and six hours of hard labor to catch this whale, and their work was only just begun.⁹

⁹ Hixson, "Journal of the Voyage of the 'Maria,' " March 2, 1833.

The next day, with the whale secured against the side of the ship, and the sails furled to keep the boat from drifting or listing, “all hands engaged in cutting in whale.”¹⁰ It was an innocuous enough phrase, but one concealing vast amounts of labor, blood, and danger. First the whale was secured to the ship using heavy chains. Next, a wooden scaffolding called the cutting stage was lowered over the carcass, where the captain and officers cut into the whale with long spades. The head, which whalers called the junk, was separated to be dealt with later, and “as the blubber envelops the whale precisely as the rind does an orange, so it is stripped off from the body precisely as an orange is sometimes stripped by spiralizing it.”¹¹

Perhaps no account of this process can match that of Herman Melville’s. To begin, Melville wrote, “enormous cutting tackles, among other things comprising a cluster of blocks generally painted green, and which no single man can possibly lift—this vast bunch of grapes was swayed up to the main-top and firmly lashed to the lower mast-head, the strongest point anywhere above a ship’s deck.”¹² A strong rope connected this block-and-tackle system to a windlass on deck, and the contraption was lowered over the whale. The second mate then started the peeling process with an incision near the pectoral fin, but it was one of the boatsteerers, tethered to a man on board by a rope tied around his waist, who had the perilous job of being slowly lowered onto the whale. Balanced carefully on the carcass, he tried to avoid being crushed against the hull of the ship on one side, sliding into roiling shark-frenzied waters on the other, and all while inserting a one-hundred-pound iron hook, attached by chain to the blocks and tackles, into the whale’s flesh.¹³ “This done,” Melville vividly described, “the main body of the

¹⁰ Hixson, “Journal of the Voyage of the ‘Maria,’ ” March 3, 1833.

¹¹ Dolin, *Leviathan*, 265-266.

¹² Herman Melville, “Cutting In,” in *Moby Dick or The White Whale* (1851; New York: Signet Classic, 1961), 296.

¹³ Dolin, *Leviathan*, 265-66.

crew striking up a wild chorus, now commence heaving in one dense crowd at the windlass. When instantly, the entire ship careens over on her side; every bolt in her starts like the nail heads of an old house in frosty weather; she trembles, quivers, and nods her frightened mast-heads to the sky.” The strain of ripping the skin off a fifty-ton whale was tremendous, and “[m]ore and more” the ship “leans over to the whale, while every gasping heave of the windlass is answered by a helping heave from the billows; till at last, a swift, startling snap is heard; with a great swash the ship rolls upwards and backwards from the whale, and the triumphant tackle rises into sight dragging after it the disengaged semicircular end of the first strip of blubber.”¹⁴ Severing this strip, the historian Eric Dolin writes, would send “the pendulous blanket piece careening across the deck, scattering the men out the way lest they be knocked senseless or pitched overboard by the swaying mass.” It was a scene that Hixson tried to capture in an illustration at the back of his journal. When Hixson penned the entry, “cutting in,” this was the extraordinary labor condensed into those two words. After all the blubber was cut in, the whale carcass was let go, the meat fetching no price.¹⁵

As the peeling of the whale continued, “down goes the first strip through the main hatchway right beneath, into an unfurnished parlour called the blubber room. Into this twilight apartment sundry nimble hands keep coiling away the long blanket-piece as if it were a great live mass of plaited serpents.”¹⁶ The blubber was then subjected to a process called “mincing,” in which the chunks of fat cut from the larger blanket were further sliced into strips called “bible leaves.” This was done to maximize the surface area of the blubber, and thereby squeeze the greatest quantity of oil from the skin of the whale. Following this the men returned to the head,

¹⁴ Melville, “Cutting In,” in *Moby Dick*, 296.

¹⁵ Dolin, *Leviathan*, 266-67.

¹⁶ Melville, “Cutting In,” in *Moby Dick*, 297.

and the “case was bailed” (the waxy substance in the head called spermaceti was ladled out with a bucket). About one-third of the oil taken from a sperm whale came from the head. Bailing the case was far easier work than cutting in, and it also produced the highest quality oil. Almost pure spermaceti, head oil fetched a higher price than body oil. Head oils were thus kept separate on board the ship, even though they were combined with body oil later in oilworks in Nantucket. The disassembly of whales was always a process shaped as much by market forces as by the specific chemical needs of manufacturers.¹⁷

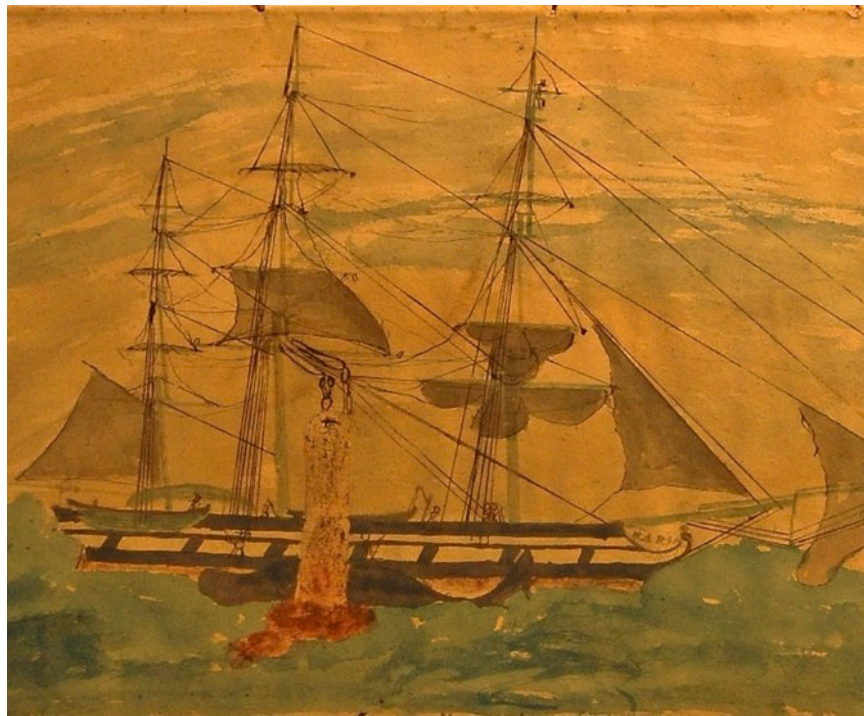


Figure 1.1. “The Maria... with a whale alongside cutting in.” (Photo by author, courtesy of Houghton Library.)

The tryworks were the metabolic centers of whaleships, where whalers boiled the bible leaves of blubber in specially constructed cauldrons called try pots. The tryworks were situated in the center of the ship, in “the most roomy part of the deck.” There, the very skeleton of the ship had been built in service of the tryworks, where the “timbers beneath are of a peculiar strength, fitted to sustain the weight of an almost solid mass of brick and mortar, some ten feet by eight

¹⁷ Davis, Gallman, and Gleiter, *In Pursuit of Leviathan*, 343.

square, and five in height.” This massive structure “does not penetrate the deck, but the masonry is firmly secured to the surface by ponderous knees of iron bracing it on all sides, and screwing it down to the timbers.” Covered by a large hatchway, the top of this brick structure contained within it “the great try-pots, two in number, and each of several barrels’ capacity.”¹⁸ Firing up the try pots, the men boiled all the blubber stripped from the whale until it had been rendered into oil, which was then placed in casks to cool. Trying out was the alchemy at the heart of the whale fishery, the pump translating deep-sea blubber into Atlantic worlds increasingly realized through whale oils. It took the crew of the *Maria* 36 straight hours to finish squeezing all the oil from their first whale, and it was only of middling size, producing 55 barrels of oil.

And where did the fuel for this days-long fire come from? “People would naturally think,” Hixson wrote, “that it took a great quantity of wood to try out so much oil, and that it would be inconvenient for a ship to furnish it but this not the case, we use no wood, but burn the scraps, and they make an excellent fire, far better than wood.”¹⁹ Melville, too, described this efficient practice, although perhaps less admiringly, whereby “the crisp, shrivelled blubber, now called scraps or fritters ... feed the flames. Like a plethoric burning martyr, or a self-consuming misanthrope, once ignited, the whale supplies his own fuel and burns by his own body. Would that he consumed his own smoke!” lamented Melville, “for his smoke is horrible to inhale, and inhale it you must, and not only that, but you must live in it for the time.”²⁰ It also made it incredibly difficult to hide. The smoke curling up into the sky would have been revealing enough for pirates, privateers, or whaling competitors, but so powerful was the stench of smoke and grease that when the tryworks were going, “a whale ship could be smelled over the horizon

¹⁸ Melville, “The Try-Works,” in *Moby Dick*, 401-402.

¹⁹ Hixson, “Journal of the Voyage of the ‘Maria,’ ” June 22, 1833.

²⁰ Melville, “The Try-Works,” in *Moby Dick*, 402-403.

before it could be seen.”²¹ Even a mid-sized whale then, required several days of continuous, gory, smoky labor to turn into oil, and usually several more to finish cooping and stowing the oil below. Deep at sea, and quite unceremoniously, the glittering lights of the modern world were being forged from grease fires and butchered meat.

Bringing whales and tryworks together, and then joining oil with lamps, was a tremendously difficult, dangerous, and energy intensive process. Producing the spatial relationships that enabled this translation of sunlight to lamplight—of solar energy congealed in the bodies of these marine giants into urban, coastal, and industrial illumination—consumed extraordinary amounts of life, labor, and food. Nor was this a linear production chain. The geography of the whale fishery was deeply entangled with and disseminated through an Atlantic capitalism realized in streetlights, lighthouses, night-worked manufactories, and heavily policed seas made violently secure for maritime trade (and deep-sea whaling). It was a political economy determining, and determined by, the making of whale light in a set of oily relationships first established through the colonial times and spaces of urban nights, dark seas, the middle passage, and the round-the-clock operation of plantation sugar works.

Mastering an Oily Colonial Atlantic: Tryworks, Streetlamps, Lighthouses, Sugar Works, and the Candles-for-Slave(ry) Trade

Indeed, it could be said the worlds of Richard Hixson and Jonathan Bruce were conceived in a five-headed fire ignited in the middle of the eighteenth century. First were the lamp-sprung flames that spread wildly through the old wooden structure of the original Boston lighthouse in 1751, leaving little behind besides the stone foundation and an island-studded harbor shrouded in fears of darkness. The keeper Robert Ball and his slave may have feared a

²¹ National Museum of American History, “On the Water,” online exhibition (amhistory.si.edu/onthewater/).

loss of livelihood, but the ship crews, watching anxiously while the crackling, bursting inferno consumed the lighthouse, knew that a dark ocean passage could mean loss of life.²² Second were fires carefully lit that same year deep at sea, which greasy blood-soaked men used to transform freshly cut whale blubber into oil to be casked and coopered: these were the first on-board tryworks.²³ Third were the smallest, but most numerous of the fires, also born in 1751, burning steadily atop the first spermaceti candles in the world. Fourth were the 5,000 new lamps burning all night, every night on the streets of London.²⁴ And fifth were the plantation boiling houses burning whale to illuminate the twenty-four-hour, six-month-long continuous production of sugar. All five fires stemmed from the shared body of an emerging Atlantic capitalism, and stoking them, constituting these constellations of light, were dark circuits of ships, barrels, oil presses, coopers, and a surprising array of animals, all scattered across oceans and continents.

Producing and Colonizing a Deep-Sea Fishery

Now, this is not to suggest that the mid-eighteenth century was the beginning of whaling, street lighting, or lighthouses. Indeed, whaling had been pursued extensively by Europeans for centuries, arguably even helping to first draw European sailors to North American shores as they followed after right and pilot whales.²⁵ John Smith and the Pilgrims sought fortunes in the “Royal Fish,” and the oil rendered from its fat had long been known as an illuminant.²⁶ Boston Light, Boston Harbor’s lighthouse, was first lit in 1716, a key beacon reducing the very real risk of

²² Smith, *The Story of Boston Light*, 24.

²³ Dolin, *Leviathan*, 108.

²⁴ Beattie, *Policing and Punishment in London*, 221-225.

²⁵ John F. Richards, *The Unending Frontier: An Environmental History of the Early Modern World* (Berkeley: University of California Press, 2006), 585-588; Ellis, *Men and Whales*, 33-47.

²⁶ Dolin, *Leviathan*, 17-29.

wreckage for the agents and objects of an Atlantic empire circulating in ships.²⁷ Moreover, the real beginning of year-round street lighting in London occurred in 1736, when, at least initially, the new oil streetlamps used seal oil, rather than whale.²⁸ And that is partly the point.

Prior to the 1750s, whale oil had been one illuminant among many, certainly less important to the metropolises than beef and mutton tallow. But London's assault on its dark streets, as well as against thieves, pirates, and privateers across the Atlantic, opened new opportunities for American fisheries. In the first half of the eighteenth century, the British Navy commenced a devastating campaign of violence and terror against pirates and privateers, which, for at least a few decades, produced an oceanic space safer for commerce and longer fishing voyages.²⁹ Meanwhile, imperial and merchant forces also combined to make maritime movements into and out of Atlantic ports easier and more closely monitored through the erection of dozens of lighthouses. The last decade before the American Revolution would witness especially remarkable changes. Boston Light was rebuilt, this time of stone and metal, and was fitted with a lightning rod. By the end of the Revolution, there were twelve other lighthouses on the east coast of the United States, eight of them in New England.³⁰ Lighthouses made possible the maritime capitalism comprised of the circulation of slaves, commodities, violence, and merchants in ships navigated mostly by sight. If caught in a storm, or in the dark of a moonless night, a lighthouse might be the only thing standing between survival and wreckage. Expanding out into and helping to colonize this newly secured marine frontier in the 1750s, Quaker whalers from the sandy,

²⁷ Smith, *The Story of Boston Light*, 12-13.

²⁸ Beattie, *Policing and Punishment in London*, 221.

²⁹ Marcus Rediker, *Villains of All Nations: Atlantic Pirates in the Golden Age* (Boston: Beacon Press, 2004).

³⁰ Smith, *The Story of Boston Light*, 44.

unimportant island of Nantucket began to risk open seas and ship-board fires to gain access to far greater whale stocks than had previously been possible.

Producing oil from whales involved two very distinct processes that were increasingly combined after the 1750s. First the whales had to be caught and cut up. Second, that blubber had to be boiled into oil. Prior to deep-sea whaling, tryworks and ships were invariably kept separate, and the distance a ship could travel from the onshore tryworks in search of whales was limited by the rapid rate at which blubber became rancid between cutting in and trying out. Tied to the coast, such a relationship between tryworks and ship meant that the vast populations of whales following deep sea currents across the globe remained entirely out of reach. It also meant that coastal communities and families remained rooted and relatively unstrained by the shore fishery supporting them.

Risking the very real danger of shipboard fires by employing onboard tryworks revolutionized the possibilities flowing through the Atlantic. It also stretched communities and families thin across time and space as the hunt for profitable whale oil scattered men on increasingly longer voyages.³¹ Suddenly within reach of ship-borne humans were vast wells of embodied solar energy formed over decades by whales.³² It was luminous energy that growing metropolises like London would pay huge sums for in the accelerating campaign to bring law and order not only to the seas, but to the streets and class relations of cities. While bourgeois men and

³¹ Lisa Norling, *Captain Ahab Had a Wife: New England Women and the Whalefishery, 1720-1870* (Chapel Hill: University of North Carolina Press, 2000).

³² According to modern estimates, there were approximately 1.1 million sperm whales in the world's oceans in 1750, and around 800,000 by 1880. This was a biomass reservoir replenished by the sperm whales eating close to 300 million tons of squid each year. Damaging though their activities were to populations, American whalers only tapped into a fraction of this energy, killing around 200,000 sperm whales over the 19th century. See especially: Hal Whitehead, "Estimates of the current global population size and historical trajectory for sperm whales," *Marine Ecology Progress Series* 242 (October 25, 2002): 295-304; Jeremy B. Jackson, "When Ecological Pyramids Were Upside Down," in *Whales, Whaling, and Ocean Ecosystems*, eds. J. A. Estes, D. P. Demaster, D. F. Doak, T. M. Williams, and R. L. Brownell (Berkeley: University of California Press, 2006), 27-37; Davis, Gallman, and Gleiter, *In Pursuit of Leviathan*, 135; Richard Ellis, *Monsters of the Sea* (New York: Lyons Press, 2006), 245.

women tried to lay claim to the night city in coffee houses and house visits, the increasingly squeezed poor and dispossessed were actively resisting the hegemony of wage-labor through rather extraordinary and widespread practices of nocturnal theft. Eighteenth- and nineteenth-century urban nights remained deeply contested spaces.³³

Colonizing Urban Nights

As the first Nantucket ships were experimenting with cutting in and trying out whale blubber in try-pots arrayed on specially built brick-floored sections of the deck, the oil street lamps of London were being met with such widespread praise that urban officials across Europe and the Atlantic would soon be scrambling to restage the drama in their own cities. But what precisely was this drama? It is a commonplace among historians of street lighting that the lamps were primarily erected to combat crime and make the streets safe. Accounts disagree as to how successful any of this was, but most agree that public safety was a driving concern.³⁴ I think the story needs to be reexamined. A look at these lamps in 1751, with an eye to the relationships they established and the spatial practices they both opened and foreclosed, should make clearer how complicated and contested were any actual connections between lights and crime.

It was about nine at night in Hockley in the Hole, when James Daniel, an Irish grocer, stepped out of the Two Brewers. Daniel had stopped into the tavern for a pint on his way home from Islington, just north of the city, and now, not surprisingly, he needed to pee. According to his later testimony, it was a piss he would regret. “I was all alone,” he would tell the court on September 11, 1751, nine days after the incident. All alone “except my shoes tied up in a

³³ Beattie, *Policing and Punishment in London*, 169-225; Craig Koslofsky, *Evening's Empire: A History of Night in Early Modern Europe* (New York: Cambridge University Press, 2011), 128-197; Peter C. Baldwin, *In the Watches of the Night: Life in the Nocturnal City, 1820-1930* (Chicago: The University of Chicago Press, 2012), 1-118.

³⁴ For recent examples see: Baldwin, *In the Watches of the Night*, 14-33; Ekirch, *At Day's Close*, 330-332; Koslofsky, *Evening's Empire*, 130-166; Brox, *Brilliant*, 20-36.

handkerchief” when he “saw three men standing by a lamp, two of them had hats, and one a cap.” Not minding an audience, Daniel went ahead with his urinary plans, and even as they “crossed over to me: then I turned up to make water, in a yard.” Big mistake. “One of them got hold on my collar, (for they did not give me leave to button up my breeches) the other on my shoulder on the other side.” He claimed he was threatened (“One swore he would knock my brains out if I stir’d”) and robbed of his hat, one shilling and sixpence, and his handkerchief containing his shoes. “After this they run from me,” he said, “two one way, and one another; and thinking to catch one of them, I called out, stop! stop! stop! but I saw no more of them that night. I know the two prisoners were two of the men,*for I saw their faces by the lamp.*”³⁵

A simple search for “lamp” in the online database of Old Bailey records reveals hundreds of convictions in the middle decades of the 18th century based on identifications made by lamplight. “Was it a light night?” “No, but there was a lamp,” became almost a scripted mantra in court proceedings. In court, Tim the Taylor, one of the three men whom James Daniel identified, turned on the others. William Newman and James March claimed that they were innocent, that Tim had later given them items of which James Daniel claimed he had been robbed. Their defense fell flat. The lamp identification was enough. Having stolen one-and-a-half shillings, some shoes, and a penknife by the light of a street lamp, Newman and March were both sentenced to hang. On October 23, 1751, they would both be “cheated” on the Tree.³⁶

What paths had led these men to the gallows? Seven days before William Newman died he was visited by John Taylor, the Ordinary of Newgate Prison. With Newman were eleven others being herded toward the same noose, looming one-week distant. James March was one of

³⁵ *Old Bailey Proceedings Online* (www.oldbaileyonline.org, March 2011) [hereafter: OBP], September 11, 1751, trial of William Newman and James March, emphasis added.

³⁶ OBP, *Ordinary of Newgate’s Account*, October 23, 1751.

these fellow prisoners. Not everyone there had been convicted by a light. David Brown, the first approached by their new visitor had been convicted of assaulting and robbing a man right under a lamp, but as the victim later claimed, although “I was very near a lamp, I did not see his face that pick’d my pocket, I saw a good deal of the other’s face; I cannot pretend to swear it was the prisoner, but he is exactly the shape, make and voice, of him that collar’d me.”³⁷ Brown, like Newman and March, had robbed his mark directly under lamplight, hardly the association between illumination and crime claimed by the proponents of better street lighting. Moreover, as even a glance at the trials and executions immediately reveals, these were almost entirely crimes against property. Of the twelve people sentenced to hang with Newman and March, eleven had been convicted of theft or smuggling. Only one had been convicted of murder, and that occurring in broad daylight.³⁸

But this only really tells us their paths to death. How were the lives of the London hanged shaped by whale light? John Taylor visited each of the prisoners in turn, recording the stories of their lives and their “final” words. James March, aged 17 and the younger of the two men convicted of the Daniel robbery, had been apprenticed to a waterman in his youth. This would have entailed a seven-year apprenticeship in which March learned the details of the waterways of London as he ferried passengers along and across the Thames.³⁹ Watermen worked in the freshwater interstices of a capitalist empire quickly centering in London and its river docks—spatial relations produced at least in part by the growing number of lighthouses helping to secure British shipping channels throughout the Atlantic world. And as was common among the

³⁷ OBP, September 11, 1751, trial of David Brown.

³⁸ OBP, *Ordinary of Newgate’s Account*, October 23, 1751. Many of the thefts had involved some kind of assault, so it is not say they were not violent, but it was still far more a case of protecting property than protecting life.

³⁹ OBP, *Ordinary of Newgate’s Account*, October 23, 1751. The ordinary’s accounts of Newgate are a remarkable resource for exploring the production of crime and criminals at the heart of the British Empire.

London hanged, March had started his career by breaking his apprenticeship and joining up with an informal street association that made its living through petty theft.⁴⁰ From his time as a waterman, March would have known London and its routes well, a useful skill when working at the edges of the legal economy.

While March had worked at facilitating travel at the geographic heart of the empire, his coconspirator, William Newman, had spent his years and labor moving violence and goods through its Atlantic arteries. Both he and March had labored to move the goods of empire along the pathways of land and sea lit by oil lamps, but Newman had also participated in the violent policing of the waves that made space for the deep-sea whale fishery. That is to say, Newman had served in the Navy. Like many of those “cheated” at Tyburn, including his fellow prisoner and night-thief David Brown, William Newman had been a sailor. After several years of fighting and toiling at sea for the crown, Newman left the Navy to begin working on a lighter (a barge for transferring goods) at Sheerness, “which lay there for the Purpose of weighing Ships Anchors, &c. from which, when he was discharged, he says he came to London, and liv’d with his Sister.” In London, Newman tried to scrape by “honestly” for a year, before turning “to rely upon the Industry of his Fingers to procure him a common Subsistence; and he was indefatigable in the Practice of picking Pockets.”⁴¹

“As an immediate result,” Edouard Stackpole has written of the mid-eighteenth-century decision to light all of London all night all year, “the demand for whale oil increased one hundred fold. The addition of more street lights resulted in the decrease of crime. It has always been an axiom that crime does not thrive in the light, whether in illumination from lamps or from an enlightened society. Great cities like London and Paris recognized these important facts

⁴⁰ Linebaugh, *The London Hanged*, 7-41, 74-118.

⁴¹ OBP, “Ordinary’s Account, 23rd October 1751.”

early, and made provisions for better lighting.”⁴² Yet as we have seen, street lamps were far from obviously making the streets safer for *anyone*. As the hundreds hanged upon a lamplight conviction would testify, these lamps could make the streets lethal. For the victims beaten and robbed right under a lamp, illumination had afforded scarce protection. Lamps, which were intended to banish the danger of theft and murder from the night streets, were in fact doing little to prevent either and may even have facilitated those very practices. Instead of protecting night travelers, these lights became instruments and symbols of property law. They enabled retributive justice for interfering with the predictable circulation of *things*, for hats and shillings, for pairs of shoes. And it was for redirecting these things through the visibility provided by lamps that hundreds would die and Nantucket Quakers were building their fortunes. Produced as Atlantic laborers, killed for attempting survival outside the wage economy, Newman’s and March’s deaths reveal a different police role for street lamps: making alternatives to the wage-relation for accessing the means of life in urban spaces too dangerous to risk.

Twenty years earlier, in 1730, London had no more than 700 street lights, which were lit for only 750 hours per year. By the time William Newman and James March were being drawn by cart down Oxford Row, that well-worn path from Newgate prison to the gallows at Tyburn, there were over 5,000 lights, each now burning for 5,000 hours a year. By 1780, the number of lamps had swollen to 15,000—which consumed annually 25,000 barrels of sperm oil, the product of about 60 ships, 1,200 whalers, and around 500 sperm whales—and it “was London’s boast that there were more street lamps along Oxford Row than in the entire city of Paris!”⁴³

⁴² Edouard A. Stackpole, “Nantucket Whale Oil and Street Lighting,” *Historic Nantucket* 32 (April 1985): 25.

⁴³ *Applied Chemistry: In Manufactures, Arts, and Domestic Economy*, ed. Edward Andrew Parnell (New York: D. Appleton & Co., 1844), 50; Stackpole, “Nantucket Whale Oil and Street Lighting,” 26; Dolin, *Leviathan*, 105.

More important, however, was the relationship between those lamps and the ultimate fate of the accused. Over the eighteenth century, the conviction rate for all crimes remained around two-thirds. The involvement of lamps did not appear to alter this significantly. What lamplight did do was drastically increase the likelihood that a guilty conviction would lead to death. For all guilty verdicts, the death rate hovered around one in six, but when the term “lamp” was mentioned in court, that figure jumped to around half. For thefts committed around lamps, approximately one-third of convictions ended in execution, while for all thefts, there was only a one in ten chance of hanging. Indeed, while petty theft continued to rise, punishments grew more severe. Lamps reduced the likelihood of “transportation” (deportation to the New World and later Australia), but increased the rate of capital punishment.⁴⁴ Authorities appeared to be using identifications of the accused, made possible by whale-light, to legally channel increasing numbers of the working poor towards death. As these lamps spread down street and alley, the working poor of London, already likely to be dislocated, now found themselves increasingly dead.

In Europe, not only did ports build more sperm-oil-burning lighthouses, but cities like Paris and Amsterdam began staging their own streetlamp dramas after the example in London. In 1765, Thomas Hutchinson of Massachusetts would write proudly that the “increase of the consumption of oyl by lamps as well as divers manufactures in Europe has been no small encouragement to our whale fishery. The flourishing state of the island of Nantucket must be attributed to it. The cod and whale fishery, being the principal source of our returns to Great Britain, are therefore worthy not only of provincial but national attention.”⁴⁵ Indeed, during this

⁴⁴ From 1736-1751, 711 men and women were killed by the state. From 1751-1766 it was 748. The next fifteen years of expanding lights saw 1191 hanged, and from 1781-1796, the figure climbed to 1486. Even accounting for population growth (about 700,000 in 1730 to one million in 1801), that represents an approximately 50 percent increase in hangings per capita from 1736 to 1796. (www.oldbaileyonline.org/forms/formStats.jsp, March 2011.)

⁴⁵ Thomas Hutchinson, *The History of the Province of Massachusetts-Bay*, vol. II (London: J. Smith, 1768), 445.

period the whale fishery was the most economically important industry in New England, accounting for a little over half of all the British sterling entering the Northern American colonies. Between 1768 and 1772, the number of whaleships tripled to over three hundred, and Nantucket was at the heart of this explosive growth.⁴⁶ It did not, however, have a monopoly on producing the means of whale-light. Nantucket dominated the whale oil trade, but until the eve of the revolution, the production of candles and graded, processed, marketable oil was centered in Newport.

Spermaceti Candles, Whale Oil, and the Making of Atlantic Sugar Slavery

In 1751, Jacob Rodriguez Rivera, who had recently arrived in Newport, Rhode Island, set up the first spermaceti candleworks in the world. Newport would soon emerge as the center of sperm oil processing and distribution, the firms there dominated by Sephardic Jews like Rivera. Not only did candles and candle making provide a profitable outlet for the products of sperm whaling, candleworks became central stations in the commodification, grading, and trading of the new stocks of whale fat laid open by the revolutionary union of ship and tryworks.⁴⁷ From Newport, spermaceti candles wrapped in blue paper and packed in elaborately labeled boxes circulated through the empire as luxury items, and as one of the principal mediums of exchange within the triangle slave(ry) trade. Sold to affluent consumers in Atlantic metropolises, sugar islands, and African slave ports, the biggest market for these candles was in the Caribbean. From 1768-1772, over 200,000 pounds of Newport candles were shipped each year to West Indian planters in exchange for sugar and molasses (for rum) wrenched from the life and labor of

⁴⁶ Dolin, *Leviathan*, 120.

⁴⁷ Kugler, "The Whale Oil Trade."

slaves—enslaved men and women, moreover, whose transatlantic journeys may very well have begun with a West African exchange of just such New England candles or rum.⁴⁸

Spermaceti candles were consumed by wealthy planters for the purposes of dining, reading, and book keeping. Moreover, planters purchased this illumination with surplus-value extracted from slaves through the combination of cane, labor, and alternative forms of light, much of it based on whale oil. Where tryworks were the primary sites of oil production, it was the boiling house that sat at the heart of cane sugar production. Boiling houses were also some of the first industrial spaces to be run continuously night and day. Long before night shifts in cotton factories, hard-pressed slaves in sugar works were boiling freshly cut cane into sugar through sunlight and lamplight in the race to keep the cane from fermenting.

The temporal violence of night-work in the mills and boiling houses formed the brutal metabolic heart of sugar slavery. Planters, who knew full well that only under conditions of slavery could they compel laborers to work twenty-hour days, took full advantage to make sugar one of the most profitable industries in the history of the world, and one synonymous with forced labor. For sugarcane to be made into sugar it had to be processed as soon as possible after being cut, and the only way to do this profitably on large plantations was to keep the boiling houses running continuously. Indeed, night-work, slavery, and sugar became hopelessly entangled in understanding and practice. During crop time, sugar planters drove their slaves so hard through space and time—through sunlit cane fields and lamp-lit sugar works—that they “would exhaust black lives as productive capacity, grinding them into sugar,” temporal murders amounting to

⁴⁸ Kugler, “The Whale Oil Trade,” 15; Bailey, “The Slave(ry) Trade and the Development of Capitalism in the United States,” 373-414; Bailey, “The Other Side of Slavery,” 35-50; Sohn, “The Other Side of the Story,” 6-12; Ellis, *Men and Whales*, 144; Dolin, *Leviathan*, 113.

“the digestion of the enslaved to enhance the vitality of the proletariat.”⁴⁹ Then, seemingly impervious to irony, those planters coldly turned around to claim that because their slaves wanted only to rest when not under the lash of the field or mill, it was proof that Africans were inherently lazy. The apparent “failure” of free labor in places like Haiti to keep sugar works running at night, moreover, was held up as further justification for the necessity of racial sugar slavery. The spatial and temporal assemblages of lamp oil, lashes, cane, and slaves in nocturnal boiling houses thus formed critical sites in the violent construction and justification of a racial capitalist political economy.⁵⁰

Planters drove their slaves through the continuous times and spaces of sugar-boiling in shifts (or “spells”) of twenty to thirty men, women, and children. Depending on the number of spells (most plantations used two, but some large ones used three), slaves would move between the dawn-to-dusk working time-spaces of the cane fields and the noon-to-midnight, midnight-to-noon (or, if three spells, eight-hour shifts) work-times of the boiling houses such that during the whole of “crop time”—which usually lasted from five to six months, but in particularly good crop years could stretch for as many as nine—slaves could expect to get no more than three hours of rest a day, if they were lucky.⁵¹ With boiling only stopping briefly for the sunlit hours of Sunday, physiological and mental fatigue was extreme, and hands torn off or caught in the mill so common that a hatchet was kept ever-ready to sever a ruined limb and prevent the machinery

⁴⁹ Vincent Brown, “Eating the Dead: Consumption and Regeneration in the History of Sugar,” *Food and Foodways* 16:2 (2008): 119.

⁵⁰ For a particularly insightful and invaluable contemporary critique see: James Stephen, “Of the Excess of forced Labour in point of Time,” in *The Slavery of the British West India Colonies Delineated, as it Exists Both in Law and Practice, and Compared with the Slavery of Other Countries, Antient and Modern*, vol. II (London: Saunders and Benning, 1830), 82-160. For an articulation and discussion of the history and meaning of racial capitalism, see Robinson, *Black Marxism*.

⁵¹ In the British West Indies it was apparently illegal for slaves to work longer than ten-hour days, but as this was understood only to apply to the cane fields, planters circumvented this temporal legal barrier to a total exploitation of their slaves times, labor, and life, by moving slaves back and forth from field to boiling house, while narrowly adhering to a literal interpretation of the law. See: *Protectors of Slaves Reports*, June 12, 1829; Stephen, *The Slavery of the British West India Colonies*, vol. II, 82-160.

from gumming up.⁵² Through the expanded time and concentrated labor of the sugar works, slaveholders were literally consuming their slaves' lives, times, sleep, and hands in the production of sugar.⁵³ But how, exactly, did planters illuminate this nocturnal engine of violence, slavery, and sugar to make it visually possible?

Several West Indian writers listed copper lamps as among the instruments a planter needed to procure to set up a boiling house, while the Jamaican planter and historian Edward Long complained that Jamaican planters were too reliant on imports of whale oil from the North American colonies.⁵⁴ A later recollection described the eighteenth- and early-nineteenth-century boiling house lamps as metal vessels, each "3 or 4 inches in diameter, and about 6 inches deep, with two tubes or spouts, $\frac{1}{2}$ inch in diameter on opposite sides, and a brail with a hook to hang it by. Underneath was another vessel to catch the constant drippings of whale oil, with which the lamp was supplied. A long, large, twisted wick was floated in it, with the two ends projecting from the spouts."⁵⁵ As the slaves tended the cauldrons, ladled the boiling sugar from copper to copper, and inspected the liquid for color, clarity, and consistency, they hung the whale oil lamps "up

⁵² Ramsay, *An Essay on the Treatment and Conversion of African Slaves in the British Sugar Colonies*, 75-77; *An Abstract of the Evidence Delivered ... on the Part of the Petitioners for the Abolition of the Slave Trade*, 56-57; *Protectors of Slaves Reports*, June 12, 1829, 17-21; Stephen, *The Slavery of the British West India Colonies*, vol. II, 137-160, 174-180; *Report from the Select Committee on the Extinction of Slavery throughout the British Dominions*, 33-39; Mintz, *Sweetness and Power*, 46-52; Follett, *The Sugar Masters*, 106-107.

⁵³ It was an even more naked and destructive form of the temporal violence that so troubled Karl Marx generations later when he observed of the factory system that "*time* is IN FACT the active existence of the human being. It is not only the measure of human life. It is the space for its development. And the ENCROACHMENT OF CAPITAL OVER the TIME OF LABOUR is the appropriation of the *life*, the mental and physical life, of the worker." Karl Marx, "Economic Manuscript of 1861-63, Continuation," quoted in Paul Burkett and John Bellamy Foster, "Metabolism, Energy, and Entropy in Marx's Critique of Political Economy: Beyond the Podolinsky Myth," *Theory and Society* 35 (February 2006), 127.

⁵⁴ Long, *The History of Jamaica*, vol. I, 414-415, 462, 492, 501, 505, 541, 551; Long, *The History of Jamaica*, vol. II, 168; Thomas, "An Historical Account of the Rise and Growth of the West-Indian Colonies," 349.

⁵⁵ Dod, "Stray Glimpses of the Cuban Sugar Industry," 93.

where light was needed,” attaching the hooks to a wall or an overhead bar running above the copper pots, or carrying the lamps about by hand.⁵⁶

Tunneling through the steady rise and fall of day and darkness, whale oil lamps made possible spaces of continuous sugar production. These lamps were, in one sense, architectural structures; as critical to creating the spaces within which the work processes of boiling sugar could take place as were roofs, walls, or support beams. If the lamps stopped transforming oil into flame-light, the sudden inrush of darkness would immediately grind activity in a nocturnal boiling house to a halt.⁵⁷ To keep these lamps burning, then, and thereby tunneling through diurnal time, planters secured wicks by paying “some of the poorer whites” on the islands to “spin cotton for the lamps in the boiling houses.”⁵⁸ Making sure that oil was on hand to fill the lamps demanded no less attention, a lesson which Jamaican planters like Thomas Thistlewood were loathe to learn: “Mr Hartnole, I hear, was quite drunk, insomuch that the boilers could get no lamp oil for the boiling house use, &c.”⁵⁹

But even if all the supplies were in order, the lamps were spatial bottlenecks, which slaves struggled to strategically sabotage and slaveholders strove to defend. “Constant snuffing, which the negroes did with their bare fingers, was required to get any light at all,” recalled one planter, and the lamps “were constantly being upset, suspending the work, until they were relighted, often by blowing the wick against a brand of fire.”⁶⁰ This Cuban planter blamed the technology for these discontinuities, but it seems just as likely that the upset lamps and work stoppages were no accidents. The slaves, driven all day in the cane fields and all night in the boiling house, where

⁵⁶ Dod, “Stray Glimpses of the Cuban Sugar Industry,” 93.

⁵⁷ Clark, “History of an Aneurism of the Crural Artery, with Singular Circumstances,” 327.

⁵⁸ *Abridgement of the Minutes of the Evidence ... to Consider of the Slave-Trade*, 135.

⁵⁹ Thomas Thistlewood, Diary, Friday, February 17, 1769, quoted in *In Miserable Slavery*, ed. Hall, 216.

⁶⁰ Dod, “Stray Glimpses of the Cuban Sugar Industry,” 93.

watchmen forced them to tend the burning wicks of the lamps with their bare fingers, would have understood perfectly well that the source of their pain was also the source of their night labor.

The Jamaican planter Thomas Roughley sought to gain advantage in this struggle by taking lamps out of the hands of his slaves entirely. “Instead of two hanging copper lamps, which are made use of in the boiling-house at night, close to the lower coppers, and the heads of the people there, to furnish them with light,” wrote Roughley in criticism of these more accessible (and probably useful) lamps, “I prefer a globe lamp ... hung in the centre of the boiling-house, at a height to prevent its being broken, and sufficiently low to diffuse general good light.” Not only would this arrangement consume oil more efficiently, but it would “prevent the thieving of the negroes, who watch every opportunity, not only to steal the oil, but the wick soaked in it. One pint of oil will be enough for the globe burners every night, whereas it takes near a quart every night, when the boiling-house is at work, to supply the lamps for the low coppers and syphons.”⁶¹

During the eighteenth century, New England merchants would arrive in the Caribbean with candles and whale oil (or slaves purchased with candles) and depart with holds filled with sugar produced through whale light. In the process, colonial merchants, whalers, and planters were arranging tryworks, lamps, candles, and boiling houses into webs of power—spatial webs operating across slave pens, ships, plantations, and waves to bind and transform the living labor of whalers and slaves, whales and cane, sunlight and lamplight into the political-economic geography of the early modern world. Sugar and oil also formed a crucial nexus in a broader temporal revolution in the Atlantic world. The temporal violence of night-worked boiling houses in the West Indies consumed African saltwater slaves to produce a highly time-durable food; this sugar was then used to quickly infuse stimulants and calories into European and American

⁶¹ Roughley, *The Jamaica Planter's Guide*, 199-200.

working classes, in response to, and allowing for, Atlantic capital's increasing "encroachment" over the (life) times of labor; and this, in turn, led to a multiplication of factory night work.

Everywhere these time-spaces expanded, moreover, so too did the consumption of whale oils.⁶²

Taking advantage of their privileged position in a mercantilist economy in producing raw materials, the Quaker men and women of Nantucket exploited this arrangement of thieves, sailors, slaves, and oil to transform their remote island into one of the centers of colonial British America. The French traveler Crèvecoeur wrote truthfully of sandy, wind-swept Nantucket that it was "a barren sandbank, fertilized with whale oil only." Astonished, he wondered "that a sandy spot of about twenty-three thousand acres, affording neither stones nor timber, meadows nor arable, yet can boast of an handsome town consisting of more than 500 houses, should possess above 200 sail of vessels, constantly employ upwards of 2,000 seamen; feed more than 15,000 sheep, 500 cows, 200 horses; and has several citizens worth £20,000 sterling!"⁶³ It was certainly a land drenched in oil, but no matter the pacifist pretensions of Nantucket Quakers, this fuel was burned at the expense of more than just whale blood.

Whale Oil in the Revolutionary Atlantic

On July 20, 1775, a band of blue-coated men crept carefully from shore into the abandoned town of Hull, at the eastern edge of Boston Harbor. Gliding through the streets, they found that the town truly had been deserted, and rapidly too, the grain still standing in the fields.

⁶² Mintz, *Sweetness and Power*, 74-150. For "saltwater slaves," see, Stephanie E. Smallwood, *Saltwater Slavery: A Middle Passage from Africa to American Diaspora* (Cambridge: Harvard University Press, 2007). Sugar was also part of a different, but related, temporal process involving the seventeenth- and eighteenth-century proliferation of coffeehouses, which were primarily patronized at night, in European and American cities. Recent scholarship has shown that these coffeehouses were integral spaces in the formation of bourgeois culture and politics, and were part of the middle- and upper-class colonization of urban nights that oil streetlamps were designed to help secure. See especially, Koslofsky, *Evening's Empire*, 174-85; Brian Cowan, *The Social Life of Coffee: The Emergence of the British Coffeehouse* (New Haven: Yale University Press, 2005).

⁶³ J. Hector St. John de Crèvecoeur, *Letters from an American Farmer* (1782; reprint, New York: Fox, Duffield & Co., 1904), 179, 124.

Quickly cutting the barley, the men loaded the boats and set out for the lighthouse island, about a mile from Hull over the water. With the lighthouse now useless to the Continental forces since the British victory at Bunker Hill a month earlier, upon landing, Major Vose and his men “took away the lamps and oil, some gunpowder, and the boats there, and ‘burned the wooden parts of the lighthouse.’ ” Although two men were wounded in the flight from the island, the Americans escaped with their barley and oil, and the lighthouse was made at least temporarily unusable. “I ascended an eminence at a distance,” an eyewitness later wrote, “and saw the flames of the lighthouse ascending up to heaven like grateful incense, and the ships wasting their powder.”⁶⁴

Both British and American forces clearly believed that control of Boston Light was worth dying for. Immediately following the arson, the British began rebuilding the lighthouse “with a force of carpenters, guarded by marines,” and the Americans prepared their next move. On July 31, three-hundred American soldiers set out in whaleboats from Dorchester. Reaching the lighthouse, the American forces struck, overcoming the guards. In the battle they killed ten, took the rest prisoner, and destroyed all the new construction. The British never lost control of the lighthouse during the war, but assaults like these left it in barely salvageable condition when it passed back into American hands in 1783.

Nantucket, meanwhile, fared even worse during the war. Naval war always dealt blows to whale fisheries. When whaleships in war zones were not being sunk or stolen, their skilled crews were usually pressed into service or imprisoned. War with a naval superpower like Great Britain proved particularly devastating. Nantucket was dangerously dependent on the regular catching of whales and trading of whale products. The interruption of commerce following the outbreak of hostilities between Britain and the Colonies would have been serious enough for an island

⁶⁴ Smith, *The Story of Boston Light*, 27-28.

community whose chief trading partner was now declared the enemy. But the nature of whaling made Nantucket especially vulnerable. First, for a voyage to be profitable, the ship had to be as close to filled with oil as possible. This meant whale ships travelled light, and any cannon or firearms on board were potentially suicidal explosives occupying space needed for (and in close proximity with) highly combustible oil. Second, whalers were experienced sailors, and thus frequently targeted for impressment. Trying out oil on board sent up plumes of smoke visible (and smellable) for miles, such that the only whaleships that evaded detection were the ones that failed to catch any whales.⁶⁵

The geography of Nantucket made the situation even more dire. As the war dragged on, not only did whaling cease, but the islanders were in danger of starving. The unraveling of Atlantic spatial relations left Nantucket stranded. For an island that had traded almost exclusively with the market centered in London, being suddenly encircled into an American geography was not only commercially disastrous, it threatened the very lives of the islanders. Cut off from the colonial mainland, and embargoed by British warships, Nantucketers struggled to smuggle enough goods to meet basic needs. To evade capture, they frequently risked supply runs in the middle of dangerous storms. Unfortunately, reaching the mainland was not always enough. Nantucket's geographic and economic position made many colonists suspicious of the islanders. Deepening this distrust was the special status often granted to the island by Parliament and the fact that the Rotches, the wealthiest members of the Nantucket-elite, had moved their operations

⁶⁵ But Britain did not just want sailors, it also wanted whalers for its own whaling industry. As John Adams bitterly complained, "Whenever an English Man of War, or Privateer, has taken an American Vessel, they have given to the Whalemens among the crew, by order of Government, their Choice, either go on board a Man of War, and fight against their country or go into the Whale Fishery." Most whalers from Nantucket were Quakers, which would have made that decision even less of a choice. Adams believed that there were at least 17 vessels of impressed American whalers forced into working the Falkland Island fishery. Quoted from Dolin, *Leviathan*, 156.

to the Falkland Islands for the war in order to continue trading with Britain. Thus, even when Nantucketers risked storm and impressment to make supply runs, many colonists refused to trade.

In the end, the unusually stormy years during the Revolution did far more damage than good for the island. In 1778, Nantucket was struck by a hurricane in summer and a blizzard in winter that destroyed half the corn crop, killed two-thirds of the sheep, and demolished wharves and buildings. Many fled, while others smuggled more oil, candles, and cattle to trade with the West Indies. By the war's end, the island's former fleet of 150 whaleships had been reduced to 30. According to Dolin, more "than a thousand Nantucket seamen, the majority whalers, were either killed or imprisoned, creating 202 widows and 342 orphaned children out of eight hundred families. Damages were estimated to be in excess of \$1 million, a number that takes on greater significance when one considers that at the time an average day's pay was sixty-seven cents."⁶⁶

Slowly, haltingly, American whaling towns began to rebuild. American cities like Boston, Philadelphia, New York, and Baltimore began to copy London's street-lighting plan, and Nantucket began to build new geographic relations from the wreckage of its transatlantic circuits. As Nantucket men went after the whales, which had grown numerous in the reprieve created by the war, and used the crisis to vertically integrate whaling with the processing and distribution of oil, Nantucket tied itself to the urban markets of the new republic. The whalers were making themselves truly into American lucifers. As old lighthouses were repaired, and new ones built all down the coast, Nantucket managed to gain back some of its former glory, emerging as the clear center of the American whale fishery in the early republic.

As with the Revolution, however, the War of 1812 sent the fishery reeling back. By 1815, only twenty-three American whaleships remained (while American naval ships had mortally

⁶⁶ Dolin, *Leviathan*, 163.

crippled the fledgling British fishery), but such was the growing demand for whale oil for both light and lubrication that only five years later, the size of the New England fleet tripled to seventy-two. By the time Hixson set sail from Nantucket in 1832, the New England fleet consisted of nearly four hundred deep-sea vessels manned by over ten thousand sailors.⁶⁷ This whaling navy had a combined mass of around 150,000 tons and a book value in excess of \$10 million.⁶⁸ Although much of that capital had been relocated to the rival port of New Bedford, Nantucket was still economically at the core of the industry. It had grown famous, and Hixson, a 31-year-old man from the inland town of Sharon, was about to try his hand as a whaler.

Assembling Antebellum Lucifers: Recruiting Whalemen and Outfitting Ships in the Age of Cotton

Nantucket Harbor, 1832. This was not what he had signed up for. He knew he was in for at least a two-year voyage that would take him across two hemispheres, perhaps to India or Japan. He knew it would be hard, dangerous work, and he might be unable to communicate with his family until he returned home. Richard Hixson knew all this, but as he reached Nantucket, he ran up against something entirely unexpected. It had been three days since he had sailed for Nantucket, but Hixson still remained tantalizingly out of reach of beginning his life as a whaler. Indeed, he and the rest of the passengers and crew aboard the sloop found themselves prisoners within sight of their destination. “Lying in Quarantine in a small sloop,” Hixson penned in his journal, “16 passengers we sleep in a small cabin, enough to breed the Cholera of itself.”⁶⁹ In a world woven of the continual movement of people and goods from port to port, that very movement could carry the means of unraveling the pattern. In the production of the means of

⁶⁷ Ellis, *Men and Whales*, 159.

⁶⁸ Ellis, *Men and Whales*, 160.

⁶⁹ Hixson, “Journal of the Voyage of the ‘Maria,’ ” September 10, 1832.

light, capital, labor, and culture had to negotiate passage with unseen, uninvited guests. In this case, that meant cholera from Boston, or more precisely, fears of cholera from Boston. Stuck on a ship in the middle of Nantucket Harbor, the passengers aboard the *Nantuck*—many of whom, like Hixson, were on their way to becoming whalers—experienced first-hand the at once enabling and disabling effects of such deeply interconnected relationships of light and cotton, plantation and ship, factory and empire.

Cotton, Cholera, and Whale Oil

Cholera had first appeared on the world scene less than twenty years before. It travelled and multiplied through British troops in India, but was most devastating in Russia. The second pandemic, the one Hixson was caught in, had traveled from Russia to western Europe to New York. Steamboats were spreading a particularly virulently strain through the newly conquered waterways of the Mississippi and its tributaries, as an expanding American empire of cotton slavery attempted to establish new roots in the lower Mississippi valley.⁷⁰ Indeed, cotton, cholera, and maritime empire had long been deeply entangled. Britain's nineteenth-century rise was woven first from the cotton threads joining New World plantations to Lancashire to the conquered South Asian colonies through which cholera had emerged.⁷¹ The bacterium flourished in the wooden worlds spreading cotton manufactures and naval violence across the globe, and at the time Hixson wrote of his captivity, it was tearing through the intestinal tracts of slaves, Indians, and planters on the American cotton frontier.

In a sense, Hixson had been partially incarcerated by the candles he intended to make. Spermaceti candles were more than just lights; they were technologies uniting the terrestrial

⁷⁰ Charles E. Rosenberg, *The Cholera Years: The United States in 1832, 1849, and 1866*, 2nd ed. (Chicago: University of Chicago Press, 1987), 13-98.

⁷¹ E. J. Hobsbawm, *Industry and Empire: The Birth of the Industrial Revolution* (1968; New York: New Press, 1999).

cotton empire embodied in cotton wicks—containing the labor of plantation slaves and urban spinners—with maritime spaces embodied in spermaceti wax—containing the labor of ship-born global whalers and centralized New England oil and candle workers. These spaces, created in combination with whale lights, were also perfect pathways through which cholera might reproduce. It was not just poor sanitation spreading cholera; the spatial production of candles, textiles, ships, and factories provided vectors for infection too. As cholera, and fears of cholera, travelled rapidly through commercial and social routes, it triggered attempts to disentangle deeply interconnected spaces. Port masters struggled to keep cholera (and outside contact) at bay so that whale oil could flow uninterrupted into Nantucket, New Bedford, and other New England ports while sailors, manufacturers, and merchants worked tirelessly to turn whales into oil into light.

The spatial relations circumscribing Hixson's passage into the fishery were the product of a braided process of cotton and oil, light and labor, land and sea. The slave plantations and (cotton) gin houses, the primary sites of cotton production, were also, like sugar works, spaces made directly through wicks, oil, and candles. In July 1828, the Supreme Court of Alabama heard a case in which a slave owner and his son accidentally set fire to their gin house when an open glass lamp fell onto and ignited the dry, fibrous cotton filling the room. Using lamps inside a gin house may not necessarily have been a widespread practice, but it was common enough that the Court asked the jury to determine how "customary" it was.⁷² What was certain was that carrying lamps into a gin house was dangerous, and anyone who spent time around ginned and baled cotton would have known of this risk. That these slave owners risked it anyway suggested

⁷² Maxwell v. Eason, Supreme Court of Alabama, July, 1828 (accessed through Westlaw, May 1, 2011): 1 Stew. 514, 1828 WL 500 (Ala.).

they may have felt they had little choice, that they needed the light to inspect their cotton and meet the demands of buyers.

And it was not only in gin houses that lamps and cotton worked with and against each other. Light and flame enveloped and threatened cotton all along its industrial life-cycle. Greeting the bales as they arrived in the proliferating cotton mills of the northeast were specially designed spaces called picker-rooms. In these rooms, low paid workers unpacked the bales shipped from the plantations, removing any remaining seeds or debris, and thereby saturated the air with tiny combustible cotton fibers. Even more than a gin house, a picker-room was, as one judge put it, “almost as perilous as a powdermagazine, to use lamps in.” Yet use them many manufacturers did. This despite the fact that such “is the extraordinary fineness of the cotton fibres and dust which fills the air in that room, in factories in great quantities, that any lamp which has air holes, or an open top and loose cover, (such as are necessary to continue or preserve the light,) is liable to be filled with them and to ignite them, and, unless the building is detached or secured by iron doors, to cause the almost inevitable loss of the whole establishment.”⁷³ However, the potential reward for using lamplight to squeeze a few extra hours of labor each day from factory workers was simply too tempting. Many industrialists chose to deliberately risk life and property in order to extend production into the evening.

Night work in cotton factories, as in gin houses, required a delicate dance between flame and fiber. One such factory in upstate New York, built in 1832, managed to successfully navigate this dance for over a decade before burning down in 1846. Not surprisingly, recounted the court in a suit brought by the insurance company, “the fire originated in the picking-room, which was situated in the center of the building, and in which a glass lamp was permanently suspended from

⁷³ Clark v. Manufacturers’ Ins. Co., Circuit Court, D, Massachusetts, May Term, 1847, 896 (accessed through Westlaw, May 1, 2011); 2 Woodb. & M. 472, 5 F.Cas. 889, No. 2829.

the ceiling, and into which room a glass lantern was carried that evening, and placed by the workman on the window-sill which the picker was in operation.” As the workman continued to pick through the raw cotton by the light of his lamp, he saw a sudden flash above the glass chimney, “as if the cotton-dust had become ignited through the air-holes, and the fire was communicated with such rapidity to the whole cotton he was unable to extinguish it.” It was not long before the whole factory was burned to the ground.⁷⁴

At first, night work in the factory had been done simply by the light of the fixed globe lamp suspended from the ceiling, but about three years before the fire, workers had begun carrying portable lights like the one that started the blaze. This was no coincidence, as the court argued, for “movable lights or lanterns are in such rooms more dangerous, though inclosed in glass, than permanent ones, as the latter can be fixed more remote from the machinery, while the former are usually employed to aid in closer observations and repairs, and constantly subject to be carried nearer what is most combustible.”⁷⁵ The very work of seeing at night, visual labor that was packaged into cotton bales and textiles, was itself incredibly dangerous. In the nineteenth-century night, seeing could kill.

Yet seeing, both at night and day, was absolutely necessary for the creation of a world of cotton, candles, and cholera. It was also a world surprisingly dependent on whales. As Hixson set sail for Nantucket, a spate of new cotton factories were being built all across the northeast (including down the road from his farm in Sharon) to transform the burgeoning Southern cotton crop into lucrative textiles.⁷⁶ These expanding industrial spaces not only created new demand for

⁷⁴ Clark v. Manufacturers’ Ins. Co., 889.

⁷⁵ Clark v. Manufacturers’ Ins. Co., 889, 896.

⁷⁶ Massachusetts Historical Commission, “Mann’s Cotton Mill Double Worker Housing,” MHC Inventory Form B, nos. 97, 98, 99, 100 (Town of Sharon, July 2008): mhc-macris.net.

light, but consumed tremendous quantities of sperm-oil to lubricate the cotton spindles. Sperm oil was necessary for producing the lights of factories, streets, and harbors; it was also the most highly sought after lubricant for the spindles spinning at the center of an Atlantic industrial revolution.⁷⁷

Whale oils and whaling were wound into the fabric of industrial cotton slavery in other, less visible ways as well. When the British declared the slave trade illegal, the candles-for-slaves trade that had emerged during the first sugar boom did not disappear; it merely moved underground. According to a study by one scholar, “in the 58 years during which the illegal slave trade was carried out” from 1807 to 1865, the number of spermaceti candles “exported easily exceeded 150,000,000 candles, worth over \$9,000,000. Most of these candles,” moreover, “were destined for the slave trade, and permitted the purchase of approximately 100,000 slaves on the West African coast.” Not only was this a highly profitable business in itself, but the New England merchants outfitting and funding most of these voyages had the additional vested interest in pursuing this illegal candles-for-slaves trade because “it would allow many thousands of pounds of slave-raised cotton, the ultimate prize for Massachusetts merchants, to be shipped to the textile mills.” When the Civil War cut off the flow of Southern cotton, spermaceti candle exports, which had been dropping steadily, suddenly surged in a trade with Brazil for its own slave-grown cotton. Indeed, the relation between spermaceti candle exports and the slave trade was so firmly established that British palm oil manufacturers and merchants publicly argued (and advertised) that developing palm oil plantations in West Africa and a palm oil and candle industry in England would both break the American monopoly on high-quality candles, and, “would help

⁷⁷ Davis, Gallman, and Gleiter, *In Pursuit of Leviathan*, 344.

force an end to the spermaceti driven West African slave trade.”⁷⁸ In this deep politicization of the production and circulation of the means of light, some interested parties actually lined up behind popular abolitionist sentiments to claim palm oil as an anti-slavery mode of light.⁷⁹

Despite the growth of palm oil, however, the illegal slave trade continued in the early republic, and by the 1840s the whale fishery came to play an even more direct role. Despite the generally anti-slavery politics of many of the Quaker ship owners and captains of the fishery, by the 1840s, when a voyage was failing or the crew deserted, increasing numbers of captains found their abolitionism evaporating in the face of profit, and willingly transformed their whaleships into slave ships. There were at least nineteen whaleships that became slavers in the 1840s and 1850s, illegally and covertly smuggling thousands of slaves into Brazil and Cuba before the Civil War put an end to the practice.⁸⁰ The perfect ships to escape suspicion, whaleships had enormous holds to accommodate the new, highly efficient “barracoon” slave supply station system on the African coast, had try-pots that could be used to cook food on deck without a need to hide, and could move through pretty much any part of the ocean at any speed without looking out of place. So perfect were these “slavers in disguise,” that “captains kept their crews in the dark as long as possible, elaborating the farce by actually spending time whaling.”⁸¹

The threefold conversion of whales into light, lubrication, and cotton slavery was driving men in the nineteenth century to scour the oceans hunting for whale oil. This New England

⁷⁸ Sohn, “The Other Side of the Story,” 8-9. See also: Bailey, “The Slave(ry) Trade and the Development of Capitalism in the United States,” 373-414; Bailey, “The Other Side of Slavery,” 35-50.

⁷⁹ In reality, palm oil was no such thing. Opening and operating new palm plantations in West Africa may have somewhat reduced the incentive for selling slaves into an illegal overseas trade, but if anything, it actually invigorated the need for and use of plantation slave labor in Africa itself. Paul E. Lovejoy, “Slavery and ‘Legitimate Trade’ on the West African Coast,” in *Transformations in Slavery: A History of Slavery in Africa* (New York: Cambridge University Press, 2012), 160-184.

⁸⁰ Kevin S. Reilly, “Slavers in Disguise: American Whaling and the African Slave Trade, 1845-1862,” *American Neptune* 53 (Summer 1993): 177-189; Dolin *Leviathan*, 225-226.

⁸¹ Reilly, “Slavers in Disguise,” 185.

nexus of whales, industry, and plantation continued to draw thousands of West Africans illegally into Brazilian, Cuban, and U.S. slavery, thousands of young women into cotton mills, and thousands of young men like Hixson into the whale fishery.

Assembling Whalemen and Whaleships

Hixson, drawn toward the fishery by the demands of this cotton-urban-Atlantic geography, had been ensnared in Nantucket Harbor by fears of a microscopic stowaway. But stuck in a floating cell, he was vulnerable to more than the risk of infection. “Riding out Quarentine everything on board goes rong,” Hixson recorded the following day with perhaps some exaggeration. “The Capt. drunk, and nothing to eat but bread and salt beef,” he complained from a crowded, probably foul smelling cabin.⁸² Three days later the quarantine was up, indicating that it had most likely been a precautionary measure spurred by reports of a small cholera outbreak in Boston earlier that week.⁸³ “Happy in leaving a small vessel, and a very disagreeable master,” Richard Hixson ended one voyage shaped by predatory non-human actors, ready to begin another in which he and his fellow crew members would be the hunters. Riding currents long plied in the pursuit of a reliable means of producing artificial light, men like Hixson were after whales, renown, and the freedom of the high seas.

At least that is what it said on the packaging. Whaling in the nineteenth century was more than an industry made in the deep between whales and whalers; it was a practice translated and reinvented in candleworks, dry goods stores, newspapers, and literature. Pictorial representations of the labor and danger of the fishery could be found on nearly every package of sperm candles or advertisement for oil. The images helped to sell these commodities, but they

⁸² Hixson, “Journal of the Voyage of the ‘Maria,’ ” September 12, 1832.

⁸³ “The Cholera,” *Boston Courier*, September 13, 1832, col F.

also participated in the creation of an imagined fishery, and such imaginings served to recruit men like Hixson, who had little direct connection to Nantucket or New Bedford, to ship out on three or four year whaling voyages. The folklore of the fishery circulated widely through Atlantic, Pacific, and Indian circuits, from stories of exotic native women, eager for love (and sex) with white sailors to the terrible travails of the whaleship *Essex*, which in 1820 was sunk by a sperm whale in the South Pacific, some of the crew surviving through luck and cannibalism to tell the tale that would inspire *Moby Dick*.⁸⁴



Figure 1.2. The Packaging – New Bedford whale oil invoice, 1855 (amhistory.si.edu/onthewater.)

Other kinds of recruitment stories circulated as well. For black men, both enslaved and free, the true stories of slaves like Prince Boston winning freedom through the Quaker fishery, and Absalom Boston becoming captain of an all-black crew, helped to reorganize the geography of freedom in the United States. Whaleships became refuges for many escaped slaves fleeing beyond the geographic reach of slaveholders' power, backed and determined as it was by the terrestrial resources and authority of the United States federal government.⁸⁵ The most famous

⁸⁴ Melville's first, and most popular (during his lifetime) novel, *Typee: A Peep at Polynesian Life* (1846), combined the adventure and eroticism of Pacific whaling, and was based in large part on his own experiences living among a group of Typee natives in the Marquesas Islands after deserting from a New Bedford whaleship.

⁸⁵ Dolin, *Leviathan*, 123, 224-225; W. Jeffrey Bolster, " 'To Feel like a Man': Black Seamen in the Northern States, 1800-1860," *Journal of American History* 76 (March 1990): 1173-1199; W. Jeffrey Bolster, *Black Jacks: African American Seamen in the Age of Sail* (Cambridge: Harvard University Press, 1997), 176-180. The historian Steven Hahn has urged scholars of slavery and anti-slavery to pay closer attention to the politics and practices of how "free" blacks and "escaped" slaves living in a slaveholding republic like the United States (with its nationally enforced fugitive slave

American slave to escape through the whale fishery was John Thompson, who wrote and published a narrative of his experience in 1856.⁸⁶ Pretending his way on board a ship as an experienced steward, Thompson was not discovered until already deep at sea. There, outside the reach of U.S. law, the captain angrily demanded to know why a man who had never been at sea before would try to ship out as a steward. Thompson explained his deception in the clearest possible terms: “I answered, ‘I am a fugitive slave from Maryland, and have a family in Philadelphia; but fearing to remain there any longer, I thought I would go a whaling voyage, as being the place where I stood least chance of being arrested by slave hunters.’”⁸⁷ The fishery, with its Quaker masters, was also one of the safest, most anti-slavery industries employing black workers, and Thompson of course gambled on this political affinity in so boldly and honestly stating his case. It was an informed risk, and it paid off. The captain kept his secret, trained him as a whaler, and by the time John Thompson returned to his family in Philadelphia with the money he had earned on his two-year voyage, it would appear that the slave hunters had given up or lost his trail.⁸⁸

At least one man who would ship out of Nantucket with Hixson had followed this path to freedom. Levi Smith, whom Hixson later taught to read, “was a slave in North Carolina” who “was sold and transported to New Orleans from whence he made his escape and came to

laws) attempted to secure freedom for themselves and for extended communities including the still-enslaved. Hahn has suggested that we not overstate the importance of sectional boundaries, and instead view the North more as a maroon geography than a true geography of freedom. Steven Hahn, *The Political Worlds of Slavery and Freedom* (Cambridge: Harvard University Press, 2009), 1-53. I would contend that the whale fishery must also be considered a maroon geography; a haven for escaped slaves and free blacks, and an incubator of anti-slavery politics, even as it produced the material and social means of continued, expanding enslavement through the circulation and consumption of whale oils for light and lubrication.

⁸⁶ John Thompson, *The Life of John Thompson, a Fugitive Slave; Containing His History of 25 Years in Bondage, and His Providential Escape: Written by Himself* (Worcester: John Thompson, 1856), 107-132.

⁸⁷ Thompson, *The Life of John Thompson*, 110.

⁸⁸ Thompson, *The Life of John Thompson*, 110-132.

Boston.”⁸⁹ On Nantucket, and aboard nearly any whaleship, Levi Smith would have encountered a thick and established maritime community of free and fugitive black whalers. The *Maria* was no exception. In the back of his journal, Hixson recorded the names and occupations of crew, and as was common at the time, of the sixteen seamen onboard (not including officers, coopers, carpenters, cook, or steward), he listed seven as “Coloured.”⁹⁰

Another sailor named “Smith,” who shipped out with John Thompson told him “the reason for his coming on this voyage, was, that being in company with some firemen, in Brooklyn, who had committed a crime in which he was implicated, he adopted this as the best means of eluding the vigilance of the officers, who were in pursuit of him, and who had taken some of the company.”⁹¹ Some of the young men onboard whaleships, moreover, had actually been placed there *by* the law. From 1827 to 1850, the New York House of Refuge, a reformist “juvenile delinquent” prison and workhouse for poor boys and girls who had run afoul of the law or been taken away from “dissipated” parents, indentured out at least 240 of its older boys on ships leaving from New England and Long Island ports for two-to-four-year whaling voyages.⁹² While some seemed genuinely excited to ship out, many others, like J.B.C., who had “made his escape four times, and made two unsuccessful attempts to escape” from the House of Refuge, were sent whaling in a last-ditch effort to geographically discipline boys who had consistently rejected the

⁸⁹ Hixson, “Journal of the Voyage of the ‘Maria,’ ” October 19, 1834.

⁹⁰ Hixson, “Names of the Maria’s crew,” in “Journal of the Voyage of the ‘Maria.’ ”

⁹¹ Thompson, *The Life of John Thompson*, 119-120.

⁹² *Documents Relative to the House of Refuge, Instituted by the Society for the Reformation of Juvenile Delinquents in the City of New-York, in 1828* (New York: M. Day, 1832), 210; *Thirteenth Annual Report of the Managers of the Society for the Reformation of Juvenile Delinquents, in the City and State of New-York* (New York: Mahlon Day, 1838), 28, 35; *Fourteenth Annual Report* (1839), 20, 35; *Fifteenth Annual Report* (1840), 23, 40, 42; *Sixteenth Annual Report* (1841), 36; *Twentieth Annual Report* (1845), 25; *Twenty-First Annual Report* (1846), 26; *Twenty-Second Annual Report* (1847), 23; *Twenty-Third Annual Report* (1848), 21; *Twenty-Fourth Annual Report* (1849), 25; *Twenty-Fifth Annual Report* (1850), 33; *Twenty-Sixth Annual Report* (1851), 29. Thanks to Seth Rockman for pointing me towards the incredible archive of the New York House of Refuge.

rules of authority, masters, and law.⁹³ Candles created paths for more than just money and cholera; they formed uneven geographies of labor that could be used to incarcerate as well as for escape. The telling of stories like these helped to guide that labor into Nantucket.

And they did not come for the sights. Although happy to finally get off the sloop, Hixson seemed hardly ecstatic to reach shore. “6 oclock,” he wrote in his journal later that day, and “have seen all that I want to of Nantucket.” Not wasting any time, Hixson spent the next day looking for a way out. Touring the docks and anchored ships, he was soon “engaged to go on board of the ship Maria Captain Alexander Macy, bound on a voyage round Cape Horn in pursuit of whale oil & bone.”⁹⁴ At last, he was going to be a whaler.

Or not. A week later and he was still stuck in a town he had had his fill of in half a day. They were supposed to have been at Martha’s Vineyard to outfit the ship by then, but “on account of a North East storm I am afraid the vessel will not leave till Sunday [the 23rd].”⁹⁵ Indeed, Hixson’s unwanted stay on shore demonstrated the extent to which a whaling voyage was a collective enterprise, depended on the assembling of a band of lucifers, some more human than others. The ship itself was an old and experienced vector of whale light. Built in 1822 in the shipyards of Haddam, Connecticut, the *Maria* had over the previous decade made three voyages around Cape Horn to the Pacific, and channeled 6592 barrels of sperm oil into Nantucket. Having just returned to port in June, the *Maria* would find itself with a new captain and an entirely new crew, but the labors and lives of the previous three crews were embedded in every repaired timber, and in every cared-for corner of the ship. Captain Macy had followed very similar paths. He first became a captain in 1821, commanding a vessel shipping from Boston.

⁹³ *Documents Relative to the House of Refuge* (1832), 160-161.

⁹⁴ Hixson, “Journal of the Voyage of the ‘Maria,’ ” September 14-15, 1832.

⁹⁵ Hixson, “Journal of the Voyage of the ‘Maria,’ ” September 21, 1832.

Over the next ten years he captained three voyages to the Pacific, the other two hailing from Nantucket, which were responsible for accumulating 6245 barrels of sperm oil.⁹⁶

As the crew readied to leave Nantucket on the *Maria*, twenty-five men would have crammed onto a deck 100 feet long and 27 feet wide, with small compartments below for sleeping, knowing they might live this way for up to 4 years. Living conditions on whaleships were worse than just cramped, however. “The forecastle,” where most of the crew slept, “was black and slimy with filth, very small and hot as an oven,” wrote J. Ross Browne, a journalist who shipped aboard a New Bedford whaler in 1842. The room, which had twelve small sleeping cubbies, “was filled with a compound of foul air, smoke, sea-chests, soap-kegs, greasy pans, tainted meat ... in a hole about sixteen feet wide, and as many perhaps, from the bulkheads to the fore-peak; so low that a full-grown person could not stand upright in it, and so wedged with rubbish as to leave scarcely room for a foothold.”⁹⁷ Such were the vessels of whale light.

Yet perhaps even more remarkable than the structures of the ships were the ways in which they became sites of truly extraordinary consumption. If a voyage produced 4,000 barrels in 14 months but sank a mile from Nantucket harbor, all that labor and energy would be lost. This was why outfitting a voyage could take so long. Ports like Nantucket and New Bedford were vectors for the hundreds-of-thousands of tons of American-made food, wood, metal, and rope consumed each year by hundreds of whaling ships being readied to leave for the Pacific whaling grounds. Each year the American fleet consumed millions of barrel staves, and barrels upon bushels of flour, beef, pork, molasses, rice, and dried apples. Whaleships were loaded with tens-of-thousands of boat boards, oars, and hundreds of whale boats so that the crews could replace,

⁹⁶ Figures calculated from “American Offshore Whaling Voyages: A Database,” *National Maritime Digital Library*, <http://nmdl.org/aowv/whsearch.cfm>. Any errors are entirely my own.

⁹⁷ John Ross Browne, *Etchings of a Whaling Cruise: With Notes of a Sojourn on the Island of Zanzibar* (New York: Harper & Brothers, 1846), 24, 43.

repair, and refit these floating factories over their four-year journeys. To even get to the whales, therefore, took a tremendous amount of labor, matter, and energy. Yet it was still not enough. Once in the Pacific, whalers had to continually seek out ports, plantations, and islands to replenish their rapidly depleted food and water supplies.⁹⁸

The *Maria* finally left Nantucket on the 24th, and “got into Edgartown [Martha’s Vineyard] at dusk.” There, Hixson and the crew labored in the rain for two weeks to load and ready the ship for its voyage. On October 8, having “Hauled ship into stream” in preparation to depart to sea, Hixson made his final arrangements with the land. He said goodbye to family and friends: “10 oclock P.M. just wrote home the last letter before I go to sea”; and he purchased products of the soil to keep him company on the water: “have been on shore this evening and bought myself some peppersauce, mustard, apples ... to take to sea.”⁹⁹ They departed at sunrise the next morning, “Edgartown fast receding from view.”¹⁰⁰

Getting to the Whaling Grounds: The Work and Nature of Sailing

After weeks of preparation and waiting for the *Maria* to finally ship out, Hixson soon realized that getting to the Pacific whaling grounds was not going to be any speedier. Yet neither

⁹⁸ “In 1858 sixty-five whaleships sailed from New Bedford. To provision these ships for their protracted voyages, the whale fishery contributed \$1,950,000 to the coffers of New Bedford merchants to purchase the following articles: 13,650 barrels of flour, 260 barrels of meal, 10,400 barrels of beef, 7,150 barrels of pork, 19,500 bushels of salt, 97,500 gallons of molasses, 39,000 pounds of rice, 1,300 bushels of beans, 39,000 pounds of dried apples, 78,000 pounds of sugar, 78,000 pounds of butter, 19,500 pounds of cheese, 16,300 pounds of ham, 32,500 pounds of cod-fish, 18,000 pounds of coffee, 14,300 pounds of tea, 13,300 pounds of raising, 1,950 bushels of corn, 2,600 bushels of potatoes, 1,300 bushels of onions, 400 barrels of vinegar, 2,000 pounds of sperm candles, 32,500 barrels of fresh water, 1,200 cords of wood, 260 cords of pine, 1,000,000 staves, 1,000 tons of iron hoops, 33,000 pounds of iron rivets, 520,000 pounds of sheathing copper and yellow metal, 15,000 pounds of sheathing nails, 52,000 pounds of coopering nails, 400 barrels of tar, 759,000 pounds of cordage, 450 whaleboats, 32,500 boat boards, 65,000 feet of pine boards, 36,000 feet of oars, 8,500 iron poles, 22,500 pounds of flags, 23,000 bricks, 200 casks of lime, 205,000 yards of canvas, 13,000 pounds of cotton twine, 234,000 yards of assorted cotton cloth, 130,000 pounds of tobacco, 39,000 pounds of white lead, 5,200 gallons of linseed oil, 400 gallons of turpentine, 13,000 pounds of paints, 2,600 gallons of new rum, 1,000 gallons of ether liquors, and 120 casks of powder.” Ellis, *Men and Whales*, 174.

⁹⁹ Hixson, “Journal of the Voyage of the ‘Maria,’ ” October 8, 1832.

¹⁰⁰ Hixson, “Journal of the Voyage of the ‘Maria,’ ” October 9, 1832.

was it going to be lonely. In contrast to the fictional voyage of the *Pequod* in *Moby Dick*, which for allegorical and metaphorical reasons was usually alone on the seas, the *Maria* sailed through channels dense with other whaleships. On the passage to Cape Horn, which they reached around January, at least one sail could be seen on the horizon nearly the entire time. And it was more than just sightings. The *Maria* spent a good while sailing, going after blackfish (a very small whale whose oil was used to trade for provisions with Pacific islanders), and socializing (“gamming”) with the *Charles Carroll*, a new whaleship that had sailed with the *Maria* from Nantucket. Not only did the crews of the two ships frequently mix and share labor and company, but many had been fellow travelers before reaching Nantucket. Aboard the *Charles Carroll* one evening in October, Hixson “had a very pleasant time with George Knapp, J.C. Edmond & Charles C. Lincoln three passengers with me in the sloop *Nantuck* from Boston. Staid on board of the C.C. till dark.”¹⁰¹ Eventually, the crews of the two ships would be divided by a leak. The *Charles Carroll*, as was not uncommon for ships that had never sailed before, sprung a leak that forced it to turn back and try to repair.¹⁰² Hixson believed, falsely it turned out, that the *Charles Carroll* had sailed back to Nantucket. Unbeknownst to Hixson, the *C.C.* was in fact able to patch the leak and reach Talcahuano in Chile (where much of the crew promptly deserted), but the *Maria* had already left it behind.¹⁰³

Sailing, of course, was more than just avoiding leaks. And whaling was mostly just sailing. Although the exciting and terrifying moments when crews in tiny whaleboats pulled hard after the beasts of the deep have received the bulk of scholarly and popular attention, the vast majority of the time, energy, and work of a whaling voyage was spent moving the ship, and staying alive.

¹⁰¹ Hixson, “Journal of the Voyage of the ‘Maria,’ ” October 13, 1832.

¹⁰² Hixson, “Journal of the Voyage of the ‘Maria,’ ” October 19, 1832.

¹⁰³ Hixson, “Journal of the Voyage of the ‘Maria,’ ” May 16, 1833.

Much of this labor sounded tedious—furling, unfurling, repairing sails—but contained in these everyday phrases was a good deal of danger and risk. Men would climb up rigging, dangling over the deck one minute and the choppy waves the next as the ship listed in the wind. The same day the *Charles Carroll* sprung a leak, Hixson, while “reeling topsail” lost his hat overboard.¹⁰⁴ As he watched it fall, it would have taken little imagination to realize how lucky he was that it was just his hat. William Johnson, another member of the crew, was not so fortunate, when “in attempting to up the leach of the fore sail fell and was considerable hurt.”¹⁰⁵

The process of sailing could put tremendous strain on a ship. Perhaps nothing illustrated better how much importance was placed on the integrity of the ship (and its cargo) than that there were two master carpenters (and two master coopers) onboard while there was only one cook, and no trained physician.¹⁰⁶ While any little problem with a boat or barrel was quickly addressed by a carpenter or cooper, Hixson waited for more than a year of painful toothache before he finally “muster’d courage to let Mr. Murphy [the 1st mate and author of the official logbook] extract it, it was almost sound, and came out quite hard as teeth generally do.”¹⁰⁷ An earlier complaint of boils that resulted in him being given one salt water and two tobacco enemas (talk about blowing smoke up someone’s ass) may have had something to do with his later hesitation to seek medical assistance.¹⁰⁸

¹⁰⁴ Hixson, “Journal of the Voyage of the ‘Maria,’ ” October 19, 1832.

¹⁰⁵ Hixson, “Journal of the Voyage of the ‘Maria,’ ” November 26, 1832.

¹⁰⁶ Captains were expected to serve as medical officers onboard whaleships, but most lacked both training and experience. Most vessels were provided with a medicine chest and an instruction manual, but this was usually of little help. According to Richard Ellis, “given the master’s experience, it was considerably safer to remain healthy.... Stories were told of masters who, having run out of medicament Number 12, simply administered equal amounts of Numbers 5 and 7.” Ellis, *Men and Whales*, 180.

¹⁰⁷ Hixson, “Journal of the Voyage of the ‘Maria,’ ” October 23, 1833.

¹⁰⁸ Hixson, “Journal of the Voyage of the ‘Maria,’ ” April 21, 1833.

And there were other physical tolls of moving through the sea. A week after losing his hat, the work of sailing brought Hixson face to face with his Creator as a storm raged about the ship. “Let the infidel scoff at religion if he dares,” sermonized Hixson, for here “on the mighty deep, the wind roaring through the rigging the sea rolling mountains high, and our bark tossed too & fro by every rolling billow, who will deny that there is a God that is able to save or destroy. God deliver me from infidelity.”¹⁰⁹ He may have been spared damnation, but the ship had suffered serious injury. The top section of one of the masts, called the “top gallant mast,” had been snapped like a twig by the holy tempest, and it was up to the crew to repair it. “Set up back stays,” Hixson wrote of the carpenters’ equipment. The crew then climbed up the rigging and carefully “carried away top gallant mast.” Soon all “hands” were “employed in making a new mast.”¹¹⁰ As the ship crossed the equator the next day, Hixson wrote that all “hands have been employed in getting up top Gallant and Mid masts that was carried away yesterday.”¹¹¹

It was dangerous work, but it was necessary if the ship was to reach the Pacific whaling grounds. “The watches are employed in unbending old sail and substituting” new ones, “making all preparations to meet the gales when we double Cape Horn,” Hixson recorded, for “Ships always experience heavy winds in doubling the Cape.”¹¹² That Sunday, at 4 PM, “while writing all hands called to take in sail.” It was a wise decision, for a “squall struck us from the N.W. furling top gallant sails, fore and aft. Reefed fore main and mizzen top sails and furling Jibe. Weather looks boisterous and very unpleasant to us sailors.” It also provoked a feeling of dislocation in Hixson, who wrote, “it is not like going to church as people do in happy America

¹⁰⁹ Hixson, “Journal of the Voyage of the ‘Maria,’ ” October 28, 1832.

¹¹⁰ Hixson, “Journal of the Voyage of the ‘Maria,’ ” November 29, 1832.

¹¹¹ Hixson, “Journal of the Voyage of the ‘Maria,’ ” November 30, 1832.

¹¹² Hixson, “Journal of the Voyage of the ‘Maria,’ ” December 11, 1832.

and then at night take there bibles or other books and sit down and read, having nothing to fear from wind and rain.”¹¹³ As captain and crew carefully navigated wind, current, and storm, they relied on the codified maritime knowledge embedded in charts, instruments, and maps, and the living knowledge embodied in the sailors, accumulated and passed on through centuries of stories, work, experience, and apprenticeships at sea.

To reach the whales, whalers had to pass through not only tempest, but searing sun. Approaching the equator in November, Hixson wrote that the weather is so “extremely warm that it is very uncomfortable sleeping below and a great many hands sleep on deck.”¹¹⁴ They made life bearable by rigging “an air sail which makes it much more comfortable below than it has been. The air circulating freely below.”¹¹⁵ Still, work could not stop. Having crossed the equator, the men labored in tremendous heat—“Decks so hot cannot stand on them barefoot”—to ready the ship for the passage around Cape Horn.

The men had to be prepared and readied too. They had to be made from Atlantic sailors into Pacific whalers. “Dead calm through all this day,” wrote Hixson staring at the thermometer, which “ranges at 90 degrees.” At three in the afternoon, before an audience of five other ships, “lower’d boats and there respective crews man’d them, to exercise. We went through all the manauvers of rowing for throughing irons, lancing, and finely taking the whale.” For most of the crew this was probably their first time attempting these practices, which “made quite a display before the ship keepers.”¹¹⁶ They were hardly experts by the time they reached the Pacific, but these exercises provided important training without wasting whales.

¹¹³ Hixson, “Journal of the Voyage of the ‘Maria,’ ” December 16, 1832.

¹¹⁴ Hixson, “Journal of the Voyage of the ‘Maria,’ ” November 21, 1832.

¹¹⁵ Hixson, “Journal of the Voyage of the ‘Maria,’ ” November 27, 1832.

¹¹⁶ Hixson, “Journal of the Voyage of the ‘Maria,’ ” November 23, 1832.

The really hard work began once they reached the Cape. Passing through that tempestuous strait, the wind and current so strong that ships were sometimes pushed backwards, was deadly and dangerous work. During one perilous night, at “9 P.M. all hands called to tack ship on account of a large iceberg or mountain of ice ahead distant one mile. The weather being thick & foggy prevented our seeing it sooner.” The iceberg was rapidly approaching the ship, “and had it been a little later in the day it being about sundown, we should likely have been lost, as it was soon dark. It rose above the sea 150 to 200 feet, looked frightfully enough. Capt Macy ... was considerably frightened.”¹¹⁷ In other storms the ship was struck by lightning, and the masts again snapped, but they made it around the Horn by February.



Map 1. Voyage of the *Maria* to the first kill. (Map by author, May 2011.)

Seven months after setting out from Boston, and Richard Hixson was cornering an enormous beast in the middle of the Pacific. It was not a whale. In fact, in all the months at sea, he had only gone after a single sperm whale, the one with which this chapter began. No, this was

¹¹⁷ Hixson, “Journal of the Voyage of the ‘Maria,’ ” January 21, 1833.

a tortoise, and he was on a mountain, not a ship. Since setting out in the *Maria* as a deck hand, Hixson had been frequently sick, lost five hats overboard, nearly collided with an iceberg around Cape Horn, repaired a mast destroyed by a storm, been robbed in Peru, and now he and the crew had to carry these hundred-pound turtles three miles back to the ship.¹¹⁸ It was not just whalemen's blood lacing every gallon of whale oil. Tens of thousands of Galapagos tortoises died in the making of that oil too.¹¹⁹

As New England whalers followed rumor, experience, and the migrations of whales, they created new spaces and relationships through their cyclical movements. The Galapagos Islands became one such space. Whalers gathered on these islands off the coast of Ecuador to exchange information and mail, resupply, and, most importantly, collect the turtles native to the islands for food. The means of sailing required wood, wind, and current, but it also required human crews capable of doing work. The relationship between ship and crew that made a whaling voyage possible meant that food must be made available. The production of lamplight was as reliant on the caloric metabolism of proteins, fats, and carbohydrates in human muscle as it was on the wind in the sails, the squid in the sperm whales' stomachs, and the fires in the tryworks.

Galapagos tortoises were a favorite means of meeting those caloric needs. Although prized for their ease of care (these turtles could go for months without food or water without losing weight or tastiness) getting them on the ship was no easy task. "All hands called at 2 oclock this morning to go after Turpine we pulled about 6 miles and landed," wrote Hixson exhaustedly in his journal, recording the crew's turtle-hauling trials. No sooner had they stepped on shore than they "immediately commenced ascending a mountain. About 2 ½ or 3 miles up the mountain we came to the place where the Turpin or Turtle live, they weigh from 50 to 100

¹¹⁸ Hixson, "Journal of the Voyage of the 'Maria,' " April 6, 1833.

¹¹⁹ Dolin, *Leviathan*, 195-196.

pounds. We have to sling them on the back like a knapsack and then travel down the mountain over briars, thorns, rocks, & everything else that is bad to the boats. This has been to me the hardest days work I ever did.”¹²⁰ The official logbook of the voyage kept by Charles Murphey, the first mate of the ship, described the same events rather differently: “Went after tortoise. Got 40 found it remarkable easy work and consequently am in great haste for the Sabbath to pass away that we might go after them for be it known our principles are such we cannot conscientiously labor on this Holy Day, Galapagos Islands.”¹²¹ Murphey, a not terribly pious individual (he complained about the Captain’s Sunday Bible readings),¹²² was almost certainly being sarcastic, although it is possible that he did not participate in the heavy labor and enjoyed his relative ease.

Nor were turtles the only non-human (or non-whale) organisms to support and be entangled in whaling. “I have taken this day an account of the live stock on board,” Hixson wrote on a lazy day, and “it is as follows, viz. 2 Sows with 7 pigs each. 1 Boar. 2 Pigeons male and female. 1 Dog. one spanish rabbit, a female, she is in daily expectation of becoming a mother. The male was accidently killed a few days since. 2 Cats male & female.”¹²³ In Tumbes, Peru, they picked up three hens, a goat and its kid, and a monkey, which they carried to Hawaii where “Jack the Monky has been sent on shore, and the crew are very happy to part with this troublesome fellow.”¹²⁴ In Hawaii they added eighteen more goats, and everywhere they stopped they stocked the ship with potatoes, “vegitable,” and fruits including “mellons,” bananas,

¹²⁰ Hixson, “Journal of the Voyage of the ‘Maria,’ ” April 6, 1833.

¹²¹ Charles Murphey, “Logbook of Maria of Nantucket” (October 13, 1832-March 21, 1836), Ships’ Log Collection, Nantucket Historical Association (material accessed from NHA online database), April 7, 1833.

¹²² Murphey, “Logbook of Maria of Nantucket,” August 13, 1833.

¹²³ Hixson, “Journal of the Voyage of the ‘Maria,’ ” November 20, 1833.

¹²⁴ Hixson, “Journal of the Voyage of the ‘Maria,’ ” May 23, 1834.

plantains, pumpkins, and coconuts grown by “human beings at work on there beautifull plantations.”¹²⁵ In summing up, however, Hixson pointed to another set of living actors inhabiting the spaces of the fishery: “This is all our live stock, with the exception of mice and cockroaches.”¹²⁶

Indeed, the combination of whale blood with these menageries made whaleships into exceptional havens for unwanted pests like rats and roaches. According to the historian Richard Ellis, rats “were more numerous on whaleships than on any other vessels, probably because of the profusion of blood and oil that soaked the decks, despite the regular scrubblings. They were more than any ship’s cat could cope with, and then as now, there was nothing that could cope with cockroaches.” Cockroaches were so endemic to whaling vessels that “for many seamen, the roaches were a more predominant aspect of a whaling voyage than whales.”¹²⁷ Smelly, loud, sharp-toothed and impossible to exterminate, some nevertheless claimed that the roaches served a useful, if unpleasant, purpose. They apparently ate the fleas right off whaler’s sleeping bodies. “[I]t is a horrible experience,” wrote William Davis in *Nimrod of the Sea*, “to awaken at night, in a climate so warm that a finger-ring is the utmost cover you can endure, with the wretched sensation of an army of cockroaches climbing up both legs in search of some Spanish unfortunate!” But this hygienic “service” came at a steep cost as it “reminds me of how many times I have placed my tin plate in the overhead nettings of the forecastle, with a liberal lump of duff reserved from dinner, and on taking it down at supper, have found it scraped clean by the

¹²⁵ Hixson, “Journal of the Voyage of the ‘Maria,’ ” May 13, 1834.

¹²⁶ Hixson, “Journal of the Voyage of the ‘Maria,’ ” November 20, 1833.

¹²⁷ Ellis, *Men and Whales*, 178.

same guerrillas. They leave no food alone, and have a nasty odor, which hot water will scarcely remove. But one becomes philosophical at sea in matters of food.”¹²⁸

Roaches also congregated deep inside the ships, inducing battles with whalemens passing in and out of the holds in the pursuit of the means of life. This was especially true when casks of water were stored in the holds, as the crew of the *Maria* discovered first hand later that year.

Having traveled from off the coast of Japan to California, the crew had stopped in Santa Barbara to refill the freshwater casks they needed to live. When the casks “were filled in St. Barbara there was hundreds of cockroaches in them, and no pains was taken to get them out previous to filling them with the water that we now drink, the consequence is that the tea and coffee smells almost as bad as the insects themselves.” If that wasn’t disgusting enough, Hixson described the ensuing war with the bugs: “Since we commenced wetting lower hold the cockroaches have come from thence to between decks in great numbers and all hands from the cabin to Forecastle have bottles (with molasses in them, for a decoy) in requisition taking these troublesome fellows and by this many vast numbers were destroyed.”¹²⁹

If these provisions ran out—whether consumed by humans, rats, roaches, or rot—especially the fruits and molasses-soaked potatoes, there could be no whaling, no light. Given these conditions, scurvy was an ever-present danger, as one member of the *Maria* experienced firsthand. William Simpson, “a coloured man has the scurvey,” Hixson recorded in September, 1833, and “he has been into a cask of earth this day, for the purpose of drawing the swelling from his legs.” Apparently, standing in dirt failed to cure him. By the time they made an emergency landing in Arica, Chile, Simpson had grown much worse and they were forced to leave him there

¹²⁸ William M. Davis, *Nimrod of the Sea; or, The American Whaleman* (New York: Harper & Brothers, 1874), 326.

¹²⁹ Hixson, “Journal of the Voyage of the ‘Maria,’ ” December 30, 1834.

in the care of a doctor. When they returned for him, he was near death, for “he had little or no care taken of him in Arica.”¹³⁰ He was dead the following day.

The transformation of living whales into oil may have been the primary purpose for whaling, but it was made possible only through the work, consumption, and geography described above. Turtles and goats, ports and plantation workers were as essential to filling a lamp as rowing after and harpooning a sperm whale. One did not happen without the others. Nevertheless, in the end, it really did come down to the whales.

The Means of Light: The Spatial Politics and Labor of Capturing, Processing, and Storing the Energy of Whales

We return now to the moment that started this chapter, that catching and trying out of a sperm whale. Whale ships were massive tools designed to transform whales into the oil that could be stored and sold as a commodity. They carried sailors and whaleboats, housed tryworks and tackles, stored barrels, food, and livestock, and thereby made it possible to translate and transport living whale fat from the Pacific into barrels of whale oil on New England docks. They were the social mouths and stomachs that provided nourishment for the flames of oil lamps thousands of miles away. As the voyage continued, the crew of the *Maria* would repeat the process of catching, cutting in, trying out, and storing below thirty-six more times. Some days they would catch as many as four whales before they began cutting in. As the *Maria* sailed through the Pacific in search of sperm whales, the assemblage of boats, men, harpoons, spades, tackles, hooks, tryworks, barrels, and holds managed to consume into storage fifty-two whales in the form of 1500 barrels of oil weighing 175 tons.

¹³⁰ Hixson, “Journal of the Voyage of the ‘Maria,’ ” November 5, 1833.

In the wooden worlds of the ships, captains and crews sought to negotiate and coordinate the processes and spaces of whaling in various ways and for multiple ends. As a ship cruised for whales, two men would generally be stationed aloft in the crows nest to scout for whale spouts. In the normal course of the voyage, the crew would be divided into shifts so that “Part of the crew are always on the watch, while the others are asleep below.”¹³¹ Yet when a whale was spotted, all hands would be called on deck, and divided into boat crews. When the boats were lowered after whales, the captain tended to be at the head of the starboard boat, the first mate commanded the larboard (or port) boat, and the second mate had charge of the waist (or, as Hixson called it, the “waste”) boat. The third or fourth mate would remain on the ship using signal flags on different masts to communicate with the boats and coordinate the hunt using information gathered by the watches scanning the waves from on high.¹³² The choreographed marking of work, space, and status set in motion on the ship, moreover, continued in the tight confines of the whale boats. Once the boats were lowered, each hunt began with “the officer steering, while the harpooner, who is termed the boatswain, rows the bow oar, until the whale is fastened with the harpoon, which operation is performed by this person. This being done, the boatsteerer goes aft and takes the officer’s place, while that person goes forward to kill the whale.”¹³³ These whales, however, were hardly passive sacks of oil waiting to be plucked up by whaleships.

Far more often, the whales escaped the *Maria*’s boat crews, who returned to ship time and again exhausted and empty-handed. That was when they were lucky. Even when they did succeed in killing a whale, it rarely went down without a fight. Hixson’s boat was repeatedly slammed by the massive tails of angry sperm whales, causing leaks and tossing men overboard

¹³¹ Thompson, *The Life of John Thompson*, 114.

¹³² Hixson, “Journal of the Voyage of the ‘Maria,’ ” April 26, 1833; Thompson, *The Life of John Thompson*, 112-113.

¹³³ Thompson, *The Life of John Thompson*, 113.

when the boat survived complete destruction. It could be a harrowing experience. During one hunt, after making fast, “the whale came up directly under” Hixson’s boat “and grounded her on his back so that for a few moments we could not get the boat off, at last he gave a spring, [threw] the boat off, and struck her with his flukes or tail and stove in the boats bottom so that it kep two men bailing continuely.” Miraculously the men managed to remain in the boat as they “had another fine ride after the whale,” dragged along by the harpoon line, “he took us through the water at a rapid rate, for two hours or more, he went in every direction, but keep within two or three miles the ship.”¹³⁴

Other times the men were not so lucky. About a year after catching their first whale, “raised two sperm whale on our leebow.” The hunt began normally enough when, after six hours of rowing for the whale, at “4 P.M. we through into him.” This proved to be an even more dangerous action than usual. The angered whale “struck the boat” with its massive flukes “and threw her entirely out of the water and everyman out of the boat with the exception of captain Macy and stove the boat.” Remarkably, heroically, the “captain held on to the whale, altho the boat was more than half full of water,” until Hixson and the rest of the Starboard boat crew swam through the churning waves for “the waste boat, which picked them up” and returned them to the captain. “The other boats coming up the whale attacked them and for a while seam’d determined to destroy them,” wrote a still terrified Hixson, “but after a while, say half an hour, we succeeded in getting an opportunity to lance him which tamed him very much, and in a short time he died.” This whale’s violence was so terrifying that “Three of the waste boat crew [a completely different boat] got frightened and jumped out.”¹³⁵ So powerful was the experience of

¹³⁴ Hixson, “Journal of the Voyage of the ‘Maria,’ ” July 12, 1833.

¹³⁵ Hixson, “Journal of the Voyage of the ‘Maria,’ ” February 11, 1834.

being tossed into the churning sea by an enraged whale that the scene inspired one of only four drawings in the whole journal.



Figure 1.3. “A view of the Maria’s boats, battling a large whale February 11th 1834 when the Starboard’s boat crew were thrown out of the boat by the whale and, the boat badly stove. The Ship is seen at a distance with her signals set at the main Top Gallant head, to inform the boats, that another whale is up. The Starboard’s crew remained in the water a considerable time after which the waste boat picked them up.” (Photo by author, courtesy of Houghton Library.)

The furious, aggressive, violently flailing whale appears commonly in the writings of whalers, but it was not the only kind of whale behavior identified as consciously resisting their human hunters. The overwhelming majority of pursuits ended with the boats returning to ship and whales swimming free, but this was usually attributed to either human shortcomings or the animal speed of the whales. Sometimes, however, whalers were thwarted by what seemed almost organized guerrilla tactics. For four days in August of 1834, midway between Hawaii and Japan, “no whale was taken altho’ the ocean was cover’d with them.”¹³⁶ Day after day the crews of the *Maria* and three other ships chased after this pod of young bulls from sunup to sundown, and

¹³⁶ Hixson, “Journal of the Voyage of the ‘Maria,’ ” July 31, 1834.

although “there were whale in all direction” they were “so wild we could not make fast altho’ we got almost on.” The wind was low and the whales too aware of the boats to be surprised. Even more significantly, however, the “wild” movements of the whales quite thoroughly confused the human crews. Were these tactics deliberate or just lucky? Regardless of intent, after four days of continuous pursuit, only one whale was caught, and not by the *Maria*. The rest of the whales managed to escape in the night.

Ship, whaleboat, and tryworks were the technologies of accumulation, and have thus received a great deal of scholarly and cultural attention, associated as they were with the romance of the hunt. Barrels, however, have been largely ignored, despite their tremendous importance. Barrels were more than just containers; they too were social organs working together to sustain webs of light over vast geographic and social distances. The entire fore-hold of the ship (the section of the bow below the forecastle) was devoted to storing unassembled barrel staves and hoops. Coopers were continually leading the rest of the men in assembling these staves into barrels in anticipation of a catch. This way, when the oil was tried out, it could be “quickly” stored in air-(and oil-)tight barrels, each holding around 31½ gallons. It typically took several days after finishing trying out to cooper and stow all the oil from a whale in the holds below deck. If things were particularly busy, the crew left the barrels on deck so that more men could go after whales. Stowing between decks was another temporary option to make more room for oil (and the men) on deck, but ultimately, the barrels would be carried below. There were two master coopers aboard the *Maria*, but as Hixson described in his journal, all hands were involved in coopering and stowing oil in the belly of the ship.¹³⁷

¹³⁷ Hixson, “Journal of the Voyage of the ‘Maria,’ ” April 25-26, 1833, June 23-26, 1833, July 5, 1833, July 16-18, 1833, December 10-12, 1833, February 18, 1834, March 17-22, 1834, March 30, 1834, April 3-5, 1834, May 13, 1834, June 29, 1834, August 22, 1834, August 26, 1834, September 11, 1834, October 7, 1834, October 9, 1834.

Storage, however, was only the beginning of a much longer process. The crew of the *Maria* periodically hauled up the oil-laden barrels to check for leaks and to reseal them. They were solidly and expertly built, but these barrels were still prone to the same kind of warp and wear that affected all wooden structures on the ship. They needed to be watered (more often in fact than the turtles) so that the staves could swell slightly and form a better seal. Yet too much water could also ruin them, as Hixson recorded when preparing for a week-long process of seeing to all seventy-five tons of oil. As soon as they got “up tackles and had everything ready to commence hoisting up and cooper the oil. 7 A.M. commenced raining. ... Watch went below. It will not answer to cooper oil in a rain,” Hixson explained, as “the cask swell and when stowed down they shrink again, which will cause the oil to leak.”¹³⁸ Later that week, Hixson witnessed how dangerous this work could be when, “while hoisting empty cask out of fore hole, for the purpose of filling with oil, William Magee one of the coopers fell down the whole distance and was badly bruised, but no bones broken.”¹³⁹

All these transformations, all this labor, all these contests between whales and boats, waves and ship, roaches and men emerged through a complex and contested government of the fishery. Ships were circumscribed spaces in which all onboard had to work together for a profitable voyage. Yet these were neither perfectly self-contained worlds, nor were the men obliged to obey the captain in order to survive. Whalemens could desert in nearly every port, which they did in large numbers. The hard fought and hard earned movement of men in and out of the fishery across its entire global span helped to create a spatial politics of labor that was both relatively egalitarian and a constant challenge for officers to manage. They could sign up on different voyages to renegotiate their “lay” (the percentage cut of the whole voyage’s proceeds)

¹³⁸ Hixson, “Journal of the Voyage of the ‘Maria,’ ” March 17, 1834.

¹³⁹ Hixson, “Journal of the Voyage of the ‘Maria,’ ” March 24, 1834.

and navigate the uncertainty of unlucky or incompetent ships. Mutiny was not unheard of, and neither was arson (sometimes deep at sea) from which the crew would escape in whaleboats.

Captains and owners had to find ways to make crews do what they wanted.¹⁴⁰

While often romanticized, the lay system of payment was, at least by the nineteenth century, more a tool of governance than it was an equitable and collective reward for laborers. It did, as economic historians have suggested, encourage whalemens to take more risks and work harder than a wage relation (in which a crew hand would still get paid the same whether or not he risked his life killing a whale or cutting it in). By the mid-nineteenth century, however, many whalemens would complete a four-year voyage only to find that their lay still left them in debt for the provisions bought when they first shipped out. Even as the overall profits of the fishery continued to climb, lays began to polarize, with captains' and officers' shares increasing while the rest of the crew earned smaller and smaller percentages. This inequality served as a measure of control by keeping men in the fishery longer, but it also generated considerable friction as the century progressed.¹⁴¹

The increasingly industrial wage economy of the north Atlantic eroded the leverage whalemens previously had in negotiating a lay (in the past many could just go back to their farms or trades). But in Pacific ports like Talcahuano and Honolulu, where whaleships and whalemens congregated in large numbers, whalemens could desert one ship and negotiate better lays with another. In the Pacific their leverage returned, and friction with officers grew alongside. Still, whaling went on, and as captains tried desperately to make voyages successful, crews were learning new ways to resist.

¹⁴⁰ Dolin, *Leviathan*, 255-274.

¹⁴¹ Dolin, *Leviathan*, 270-273; Davis, Gallman, and Gleiter, *In Pursuit of Leviathan*, 150-213; David Moment, "The Business of Whaling in America in the 1850's," *Business History Review* 31 (October 1, 1957): 261-291.

While anchored at Talcahuano, Eliza Brock, the wife of the captain of the *Lexington*, watched from the decks as yet another fire erupted into this story. The port of Talcahuano, Chile, where whaleships frequently stopped to resupply, was also a site of unusual resistance. Based on the tables provided by the nineteenth-century whaling historian Alexander Starbuck, it would appear that no port saw more whalemens desert than Talcahuano.¹⁴² What Eliza Brock witnessed was less common, but far more frightening to the owners and capitalists of the fishery. “Yesterday,” Brock wrote on March 17, 1856, the *George Washington* was “Set on fire by four of the sailors. They towed her on shore and scuttled her. Today is still burning. They are in safe keeping tied up in the rigging.” Later that night “the fire from the George Washington burst through; she is all burning up; her masts fell this morning at 6 o’clock. An awful sight to see that noble ship perishing in the flames; all by the recklessness of depraved sailors.”¹⁴³

Shore-leave was another point of friction. On the *Maria*, only half the crew was allowed on shore at a time (usually with the expectation of purchasing provisions), and captain Macy strictly forbade returning with alcohol or prostitutes. As these restrictions were not uncommon, the less disciplined aspects of the fishery became concentrated in the brothels, bars, and markets of Pacific ports. That these were also the same spaces targeted by missionaries led to conflicts over interaction with and practices between “natives” and whalers. Hawaii was a particularly contested space. As Hixson perhaps somewhat exaggeratingly described, in “Mowee [Maui] a female is not allowed to go on board a ship when at anchor. This is not the case at Hoahoo [Oahu], we went on board the W.L.P. and her decks were cover’d with abandoned females, who swim off to every ship that comes to anchor at this island, and become bedfellows with the

¹⁴² Alexander Starbuck, “Returns of Whaling Vessels, Sailing from American Ports, Since the Year 1715,” in *History of the American Whale Fishery from its Earliest Inception to the Year 1876* (Waltham: Alexander Starbuck, 1878), 168-659. See also Nantucket Historical Association online logbook search: www.nha.org/library/librarydatabases.html.

¹⁴³ Eliza Brock, “Eliza Brock Journal,” March 17-18, 1856, Ships’ Logs Collection, Nantucket Historical Association.

officers, and sailors, if the Captain will permit it.”¹⁴⁴ Needless to say, the Christian missionaries living on the islands made considerable effort to stop these kinds of sexual interactions and “sinful” practices. After a sailor was jailed for drunkenness in 1852 in missionary-controlled Honolulu, the frustrated whalemens onshore rioted and only a lucky wind kept the 150 whaleships in the harbor from catching fire.¹⁴⁵

By continually asserting the right to thread their lives and labor into and out of the processes of producing whale light on their own terms, whalemens helped make the fishery into a fugitive geography. Fugitive slaves like John Thompson and Levi Smith smuggled themselves onboard and into the work-rhythms of whaleships, while others fled the law from different directions. Having escaped the New York police, and finding himself at odds with the captain and officers after a near death experience in a stoved boat, a different Smith—this the sailor who had fled the New York police to ship out with the fugitive slave John Thompson—deserted in Madagascar with three others from the ship, only to be betrayed by the locals, recaptured, flogged publically by the captain, and then escape again, leading multiple ship captains and crews in pursuit, triggering more desertions, and precipitating collective struggles over movement, labor, and authority.¹⁴⁶

For the young men of the New York House of Refuge, the fishery became more of a carceral than a fugitive geography, but they too developed strategies within this strange politically determined community of young seamen to control their movements. House of Refuge reports were littered with stories like those of C.D., T.S., and J.L., “one of our hardest boys,” who each shipped out on whaling voyages only to be “left for sick” (or so they claimed) in Maui, Tahiti, or

¹⁴⁴ Hixson, “Journal of the Voyage of the ‘Maria,’ ” May 24, 1834.

¹⁴⁵ Ellis, *Men and Whales*, 163.

¹⁴⁶ Thompson, *The Life of John Thompson*, 120-127.

the Marquesas as soon as the ship reached the Pacific, and then made their way back to the House of Refuge to share their tales with the other inmates.¹⁴⁷ As anti-slavery fugitives, men on the lam, “juvenile delinquents,” and all Melville’s “meanest mariners, and renegades and castaways” struggled their ways in and out of the watery and wooden worlds of the fishery, they practiced and nurtured a counter-politics to the pro-slavery, pro-industrial political economy being made through the circulation and consumption of the very cetacean products of their labor. It was a beautiful contradiction, full of all the tragedy, irony, and wonderful possibility that has always inhabited the real lived politics and weapons of the weak.¹⁴⁸

At the same time as captains wrestled with crews over the shape, boundaries, and meaning of whaling, they had to contend with an equally complicated international political geography encompassing the fishery throughout the Spanish Pacific. On May 18, 1833, having reunited with the *Charles Carroll* off the coast of the Galapagos Islands, Hixson heard of “a great sensation among the Captains of whale ships produced by a tragedy lately acted in Valparaiso.” It was quite a remarkable tale. Captain Paddock of an American whaler had gone “into one of the public offices and behaved so violent and crazy that the cleric of the office commenced writing a note to the American minister in that place to have Capt. Paddock secured as he appeared perfectly mad. He did not finish the letter, but death put an end to him just as he had

¹⁴⁷ *Fourteenth Annual Report of the Managers of the Society for the Reformation of Juvenile Delinquents* (1839), 4; *Twenty-First Annual Report* (1846), 32-33; *Twenty-Third Annual Report* (1848), 26, 29.

¹⁴⁸ For more on Atlantic maritime anti-slavery, egalitarian, and counter-mastery cultures and politics, see: C. L. R. James, *Mariners, Renegades & Castaways: The Story of Herman Melville and the World We Live In* (1953; 1978; Hanover: Dartmouth College Press, 2001); Julius Scott, “The Common Wind: Currents of Afro-American Communication in the Era of the Haitian Revolution,” PhD diss., Duke University, 1986; Marcus Redicker, *Between the Devil and the Deep Blue Sea: Merchant Seamen, Pirates, and the Anglo-American Maritime World, 1700-1750* (New York: Cambridge University Press, 1987); W. Jeffrey Bolster, *Black Jacks: African American Seamen in the Age of Sail* (Cambridge: Harvard University Press, 1997); Peter Linebaugh and Marcus Redicker, *The Many-Headed Hydra: Sailors, Slaves, Commoners, and the Hidden History of the Revolutionary Atlantic* (Boston: Beacon Press, 2000); David S. Cecelski, *The Waterman’s Song: Slavery and Freedom in Maritime North Carolina* (Chapel Hill: University of North Carolina Press, 2001); Marcus Redicker, *Villains of All Nations: Atlantic Pirates in the Golden Age* (Boston: Beacon Press, 2004); Marcus Redicker, *The Slave Ship: A Human History* (New York: Viking, 2007).

wrote this sentence. He (Paddock) is now in the office raving mad and must be secured. Just as he had finished this sentence, Captain Paddock came up to him and stabbed him in the heart.” Fleeing wildly into the street, Paddock then violently attacked five other “Spaniards,” killing three, before he was knocked down by the crowd and was nearly killed himself. While Paddock lay stunned on the ground, “a Spaniard came up with a large stone in both hands and was in the act of throwing it on his head when an English Lieutenant who belonged to a man of war then lying in the harbor, happened to come up, and drew his sword, straddled the body of Paddock and threatened to kill the first man that injured him.”¹⁴⁹

As Hixson told it, the presence of this English officer was the only thing enforcing the rule of law. It was a diplomatic calculus that saved the mad captain’s life. At least temporarily. Under pressure from the English naval officer, “the Spaniards agree’d to let him be sent to prison and be tried for murder. He was therefor put in jail and tried and acquitted on the ground of insanity, but was kept in confinement for safe keeping as he continued crazy as ever.” Yet as soon as the frigate sailed, “the unfortunate Paddock was again arraigned for the same offense and convicted and sentenced to be shot, which sentence was carried into execution. The Spaniards did not dare to convict him as long as the frigate was in port, but as soon as she was off they killed him.”¹⁵⁰ Law and sovereignty were continually renegotiated practices in the worlds the whalers made.

Elsewhere, whalers exploited this shifting legal terrain to achieve favorable and untaxed terms of exchange. In other words, they became smugglers. In the Peruvian port of Tumbes, for example, the “cause of our leaving this day is the captain having suspicions that the spaniards are about seizing the ship for a breach of the revenue laws. He has sold a great many goods all of which have gone on shore without paying duty. This is a fine place for smuggling, the custom

¹⁴⁹ Hixson, “Journal of the Voyage of the ‘Maria,’ ” May 18, 1833.

¹⁵⁰ Hixson, “Journal of the Voyage of the ‘Maria,’ ” May 18, 1833.

house being at the town 9 miles up the river, and no officer of the customs on board ship, as is the case in the port of Arica.” Hixson, like many American whalers, seemed to have a rather strong dislike of all things Catholic, especially if it spoke with a Spanish accent. As he explained it, this smuggling was but the inevitable result of the fact that “spaniards are a difficult set of people to trade with they will cheat if they can. Capt Macy had difficulty with almost everyone he had dealings with, which made him suspicious that they would seize the ship.”¹⁵¹ So, honest though they would like to be, American whalers like the men of the *Maria* were forced by the lying cheating Spanish to lie cheat and abscond in the night. It really made perfect sense.

Gamming was another practice that captains used to coordinate voyages, and it too could generate friction. Months after their first pleasant gamings with the *Charles Carroll*, Hixson wrote that “I for one (and I am not alone) think it wrong for the captain to be visiting all the ships he sees. We came here after oil, not for the purpose of going, day after day, and night after night on board other ships to have a chat, making the men pull the boat at 10 or 12 o'clock at night after there Captain, when he ought to have staid on board his own ship.” It was not simply that Hixson and the crew found these meetings tedious, “it is very unpleasant for men (very likely after a hard pull after whale) to lower boat at 10 or 11 o'clock at night for the purpose of fetching the captain on board.” Gamming, he crescendoed “is a great damage to the voyage, we are not so likely to get oil, it is bothersome to the men, and it ought not so to be. I think if it had not been for this practice we should have had more oil than we have got. We are all sufferers by this foolish practice, and no one is benefitted by it. It is wrong! wrong!! wrong!!!”¹⁵² Through the circulation of news, letters, and stories of home and fishery, these meetings may have played central roles in the articulation of informed authority among captains and served to facilitate

¹⁵¹ Hixson, “Journal of the Voyage of the ‘Maria,’ ” January 13, 1834.

¹⁵² Hixson, “Journal of the Voyage of the ‘Maria,’ ” November 17, 1833.

long-distance community-building for crews; but many whalemens would just as rather skip the ritual and get home faster.¹⁵³

Indeed, getting everyone to work together in the economic interests of the voyage took considerable skill that not all captains or officers possessed. The crew of the *Franklin*, one of the ships the *Maria* encountered, told Hixson of how their “first mate proved to be a tyrent and they knocked him down a few times, which helped him very much. The Captain gets frequently intoxicated and knows not what he is about. The Franklin has lost 4 men by accident, 2 fell from aloft one was killed instantly the other had both legs brocken and was sent home. 2 were taken out of the boat by the line and were not seen afterwards.”¹⁵⁴ A badly governed ship could lead to desertion as well as death. On shore near Tumbes (the smuggling port), Hixson saw “the grave of Collins one of the ship Lopers crew of Nantucket. He was shot by the mate of that ship in this place in the year 1831 when in a passion.” The mate, understanding the uneven geography of law “made his escape from Nantucket after the ship arrived there to avoid coming to tryal.” More poignantly, Hixson noted, by “the side of Collins grave, is another one, where lies the remains of one of the Kingston’s crew, of Nantucket Capt Sherman of that ship abused him so while crossing the barr that he jumped out of the boat and was drowned. This last accident, if accident it can be called, took place a short time previous to our arriving here.”¹⁵⁵

Typically, it was the practice of discipline around which the greatest tensions hovered.¹⁵⁶ From the crew of the *William Thompson*, Hixson learned that when “at St. Francisco Capt. Potter was one day about flogging the steward when the crew interfered, the captain called a number of

¹⁵³ Between April 27 and July 23, 1833, Hixson counted that the *Maria* spoke with ships 52 times in a period of only 87 days. Hixson, “Journal of the Voyage of the ‘Maria,’ ” July 9, 1834.

¹⁵⁴ Hixson, “Journal of the Voyage of the ‘Maria,’ ” July 6, 1833.

¹⁵⁵ Hixson, “Journal of the Voyage of the ‘Maria,’ ” January 5, 1834.

¹⁵⁶ Dolin, *Leviathan*, 256-259.

spaniard from the shore, they came on board and by the instigation of Potter, one of the spaniards ran a man through with a cutlass and he died immediately.” “The crew represent Potter as a great villain,” Hixson noted, and an “investigation of this affair will take place when the ship arrives in the United States as the crew are determined to inform against him.” Inconvenient as it might be for the captain, however, Potter would probably not have tried to prevent the crew from testifying. On a previous voyage, the crew told Hixson, Captain Potter “stuck the cook of his ship with a brand of fire and put out both his eyes which cost him on his arrival in America 5000 dollars.”¹⁵⁷ Five thousand dollars was certainly a considerable amount of money, but it was not jail, and it was not career-ending. In contrast to these poorly governed ships, Hixson usually described Captain Macy as an effective and fair administrator. “A foolish affair took place,” Hixson noted, “in which six of the people living in the steerage were concerned.” He was vague on the details, “but they all acknowledge that they had don wrong and were sorry for it with the exception of one.” Using the rhythms of ship-board work as a disciplining tool, “as a punishment Captain Macy has stoped for the present [William Johnson’s] watch below in the daytime and given the officers orders to keep him at work.”¹⁵⁸ Denying him his customary time off, his “watch below,” Johnson would be kept at hard labor for two weeks before being allowed to resume his usual breaks from work.¹⁵⁹ Captain Macy was flexing his authority by declaring this maritime custom to be a privilege, not a right, under his command.

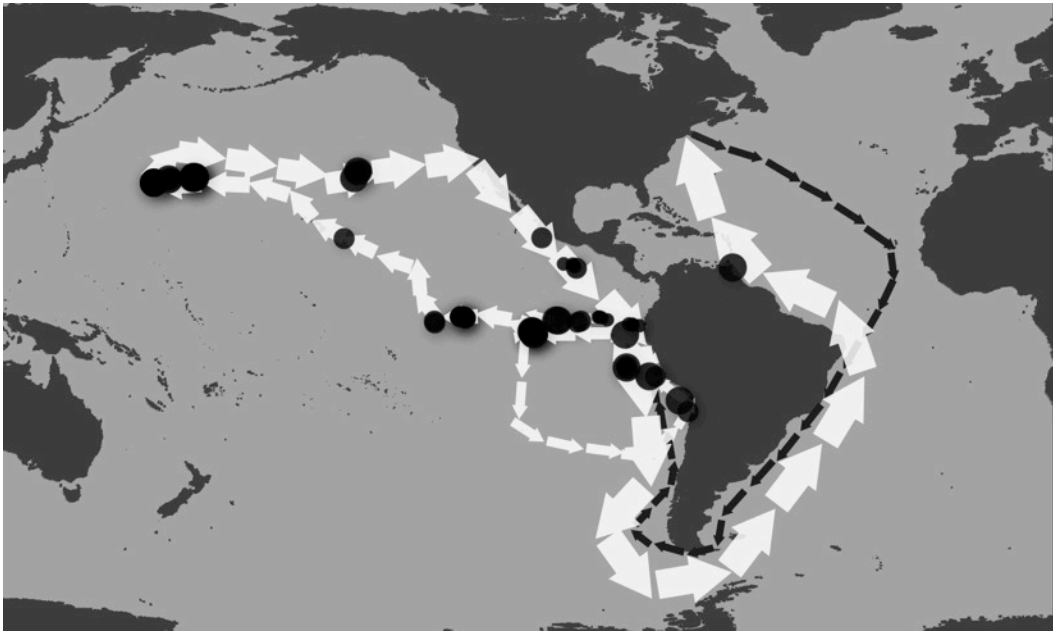
As a voyage wore on, crew, ship, and sea continued to negotiate complicated social and ecological relationships in the process of accumulating oil. When the hold was full, or the voyage had gone on too long, the whaleship would return to the port of origin (usually Nantucket or

¹⁵⁷ Hixson, “Journal of the Voyage of the ‘Maria,’ ” January 25, 1834.

¹⁵⁸ Hixson, “Journal of the Voyage of the ‘Maria,’ ” August 13, 1834.

¹⁵⁹ Thanks to Jennifer Seltz for bringing the significance of the “watch below” to my attention.

New Bedford) and unload the barrels on the wharves. Barrels containing the congealed labor and energy of whales and whalers from the Atlantic, Pacific, Indian, and Arctic oceans converged in tremendous quantities along the Nantucket-New Bedford axis for about a century before the once massive flows dwindled to a trickle in the 1870s.¹⁶⁰



Map 2. Complete voyage of the *Maria*. Black arrows show outgoing voyage. White arrows track the voyage after the first catch. Size reflects total amount of oil accumulated. Black circles indicate catches and amount of oil tried out. (Map by author, May 2011.)

By the end of Hixson's journal on December 31, 1834, the *Maria* had accumulated around 1500 barrels of sperm oil, weighing more than 175 tons, but it was not a terribly impressive voyage. It was an average catch, but a longer than normal trip. On each of the *Maria*'s previous three voyages, the ship had returned with around 2,000 barrels, and had done so in less time.¹⁶¹ Hixson's journal ends in 1834, so we cannot follow him for the rest of the voyage of the *Maria*, which continued another fifteen months. The official logbook of the voyage, however, indicates they only captured a few more whales in all that time. As whalers were paid by the

¹⁶⁰ Davis, Gallman, and Gleiter, "Product Markets," chap. 9 in *In Pursuit of Leviathan*, 342-380.

¹⁶¹ National Maritime Digital Library: <http://nmdl.org/aowv/whsearch.cfm>.

barrel, and each whaler was given his “lay,” or percentage of the profits of the voyage calculated in barrels, it should be no surprise that after months of hardly a drop of oil added, several men deserted the ship in Talcahuano, Chile, in 1835.¹⁶²

Concentrating the World’s Oceans: Whale Oil Depots and the Manufacture and Commodification of Oil and Candles in Nantucket and New Bedford

On March, 12, 1834, Christopher Mitchell, the agent for the *Maria*, wrote from his Nantucket office to “Mr. Thos. Folger,” that “You will have seen by the papers that the Chas. Carroll has arrived with a good voyage and that she reports the *Maria* with 1,500 bbls. This is what Capt. Macy writes us he has got; he also writes that he shall use up two months in looking for whales on his passage home, & that we need not look for him until after the middle of April & we were in hopes that he would add something to his oil in that time.” As Mitchell was writing this letter, however, at “Half-past four P.M. Capt. Macy has just arrived & informed us that he was obliged to make the best of his way home on account of the Scurvy, being entirely out of vegetables. He has one man down with the scurvy now. He took one 40-bbl. whale off Trinidad.”¹⁶³ Limping into port, the *Maria* had added only 150 barrels in 15 months. Hixson never recorded his lay, nor his reason for going whaling, but as he returned to New England, it seems likely that he left the fishery with his proceeds (and possibly debts) and returned to Sharon via the newly constructed Boston-Providence Railroad. Thus ended the journey of one lucifer, but the products of his labor were still not yet lights.

Getting barrels onto Nantucket docks may have marked the end of a whaler’s direct relation to the production of the means of light, but it would take a series of relays before that oil could end up in a street lamp or domestic candle. When Hixson had first arrived in Nantucket

¹⁶² Murphey, “Logbook of *Maria* of Nantucket.”

¹⁶³ Christopher Mitchell & Co. Papers, “Letter Book 1,” 39-44, Nantucket Historical Association.

four years prior, 5,000 barrels of sperm oil had just been deposited on Nantucket docks, 2170 by the ship *Loper*. Owned by the wealthy Starbuck family, most of the oil from the *Loper* was immediately bought and transported to the Starbucks' candleworks. Much of the oil from other ships, however, would have remained packed along the wharves, while ship owners sought to find buyers. As Hixson waited to ship out in pursuit of barrels of his own, he likely saw men and horses wheeling these whale oil containers about town, moving the distilled products of human labor and cetaceous life that would become the oil burning in street lamps and lighthouses down the American coast.

Before this oil could enter a lamp it had to be further processed and then carried to market. As recounted in the memoirs of the Starbucks, a family of oil merchants, the "black, greasy, bulging casks were hoisted from the hold ... and rolled onto the 'dray,' two long planks balanced on and fastened to the axle of two wheels. A horse was harnessed between the upper ends of these planks, while the lower ends could be tipped down to the ground; three and sometimes four casks were rolled up the planks and balanced so that one horse could move a very heavy load."¹⁶⁴ Plodding along cobblestoned streets, these horses would have pulled oil-laden barrels past an idle Hixson to one of the few dozen oil and candle works in Nantucket. According to whale oil expert Mark Foster, by "1832, there were forty-three oil and candle works in Nantucket. Annually, 250 workers produced 1,400,000 gallons of sperm oil and 1,200,000 pounds of candles. Turning the raw materials of whaling into finished products, Nantucketers came to dominate the manufacture of whale oils as they dominated whaling."¹⁶⁵ In the process, they transformed the spaces and possibilities of the cityscape through which Hixson and the crew

¹⁶⁴ Will Gardner, *Three Bricks and Three Brothers: The Story of the Nantucket Whale-Oil Merchant Joseph Starbuck* (Cambridge: Riverside Press, 1945).

¹⁶⁵ Mark Foster, "The Hadwen & Barney Candle Factory: How it Worked," *Historic Nantucket* 59 (Fall 2009): 5.

of the *Maria* had shipped out to the Pacific and shipped back in again with hundreds of oil-laden barrels of their own. The very cobblestones over which horses drew the liquid light accumulated by ships like the *Maria* and the *Loper* were artifacts of light-making. Decades before, as Nantucket sought to recreate itself from the devastation of the Revolution, “already people were complaining that the heavy drays” dragged by the horses “cut the roads too deeply and the proposal was made that cobble-stones be placed on Main Street as far up as New Dollar Lane, ‘where the Starbucks were adding to their try-works and candle factories.’ ”¹⁶⁶

While George Mitchell, agent for the *Maria*, contracted with men to channel those 1,500 barrels over cobblestones and into candleworks, the owners of these long sheds would have watched “the try-house come to life. The wood was wheeled in, the fires started, and lines of men drawn from the cooper-shop and the cordage-shop passed in and out carrying heavy buckets of crude oil.” These were the laborers that arrived with a new shipment of oil, and disappeared back into making barrels and rope once operations were under way. Before they left, the “kettles were filled; the heat became intense as the oil bubbled and seethed in the kettles, throwing off steam and sending particles of blubber and other impurities to the surface to be skimmed and fed to the fire.”¹⁶⁷ These activities took place year-round, but they were only one step in the process.

Once the oil was purified, men carried it in buckets to a cellar or storehouse where they placed it in casks until a cold day in winter. Oil processing was deeply seasonal work. The reason for this seasonality was that the oil had to be brought down to a sufficiently cold temperature in order to be further separated and graded. To accomplish this separation, workers stuffed the semi-solid oil cakes into bags and loaded them into the massive press that dominated each candleworks. In the Starbucks’ try-house, at each end “stood a spermaceti press. Huge beams,

¹⁶⁶ Gardner, *Three Bricks and Three Brothers*, 32.

¹⁶⁷ Gardner, *Three Bricks and Three Brothers*, 34.

sixteen inches square and over thirty feet long, hung in the air along the sides of the shed. These were the timber-levers. One end was held between two massive upright posts.” In front of these gigantic levers, were the press-boxes, into which, Gardner wrote, men “placed the bags of ‘black-cake’ separated into layers by heavy wooden ‘leaves.’ ” Once filled, the men began the pressing by lowering the post-end of the beam “until it rested on the topmost of the ‘leaves.’ The very weight of the beam-end made the oil start from the bags; but when” the force of the beam was increased by applying weights to the other end, “there gushed from the bags clear and limpid oil, the first and finest product of the whole process.”¹⁶⁸

This first pressing, which exerted “two thousand pounds of pressure per square inch” was called “Winter Strained Sperm Oil,” and because it was done at such cold temperatures, the liquid pressed from the cakes would resist freezing or congealing in even New England winters. About two-thirds of the crude was converted into winter oil, which would be used in street lamps, lighthouses, and for industrial lubrication.¹⁶⁹ To ensure its quality, the owner of the works “dipped his finger into this finished product; he rubbed it in the palm of his hand; he sniffed its odor and touched it with his tongue for its taste.”¹⁷⁰ The remaining solid was then stored again until temperatures reached about 60 degrees. Again, the cakes were pressed, the lower quality oil squeezed out called “spring oil.” This accounted for about ten percent of the final product. Finally, in summer, the cakes were “pressed a third time, at one hundred thousand pounds per square inch.” From that extraordinary pressure trickled “summer oil,” or “taut pressed oil,” five

¹⁶⁸ Gardner, *Three Bricks and Three Brothers*, 36.

¹⁶⁹ Davis, Gallman, and Gleiter, *In Pursuit of Leviathan*, 344.

¹⁷⁰ Gardner, *Three Bricks and Three Brothers*, 36.

percent of the total product.¹⁷¹ When the *Maria* returned to Nantucket, it was the beginning of spring, and the oil from the voyage would have thus remained in storage until the winter.

By late summer or autumn, when many ships would return from voyages, “only one man was at work” in the Starbuck factory, but before “the year ended, eight would be needed.” For the final stage in the production process, Joseph Starbuck would have “watched the man as he lifted the flattened bags when they came from the press. As the spermaceti left the bag and fell into the kettle, it was yellowish, dry and brittle.” To transform this into the white, perfect candle wax of such fame, under “the heat of the fire it would turn to oil,” and to the mix “water and potash would be added, then hardening substances. Vapors would rise carrying off the water and potash and the mixture would be ready for the molds.” A cylinder of spermaceti, however, was not by itself a candle. A wick was required too. “In the ‘yarn room’ a woman was twisting cotton yarn for the wicks,” recalled Gardner. Starbuck would have “picked up one of the wicks and untwisted it; it had six separate strands.” Meticulously, he would have “compared it with the pattern; he frayed out an end; rubbed the soft bloom he had made against his cheek” and may have said condescendingly to the woman, “ ‘Never forget that you are doing the most important job; the candles can be spoiled if you fail to see that these wicks have the proper texture and size. We must send out the best candles made—if we do not do our best they will say that we make sperm candles like old taller dips.’ ” Molding and wicking would take two days and then “the candles would be inspected, counted, boxed and shipped.”¹⁷²

Schooners and sloops were continually transporting these finished products from the Nantucket and New Bedford oilworks to agents and wholesalers in Boston, New York, and Philadelphia. The *Nantuck* that had first brought Hixson to Nantucket was likely one of these

¹⁷¹ Davis, Gallman, and Gleiter, *In Pursuit of Leviathan*, 344.

¹⁷² Gardner, *Three Bricks and Three Brothers*, 37-38.

transporters. And when he returned to Boston, it was likely on a vessel laden with the products of the fishery. For decades these oils had flowed from sea to ship to works to lamp, prompting Melville's declaration that "though the world scouts at us whale hunters, yet does it unwittingly pay us the profoundest homage; yea, an all-abounding adoration! for almost all the tapers, lamps, and candles that burn around the globe, burn, as before so many shrines, to our glory!"¹⁷³ Even as Melville wrote these words and Hixson sailed past Boston Light for a second time, however, this relationship was beginning to unravel.

Conclusion: Darkening the Fishery

The imperial and industrial revolutions of the mid-nineteenth century accomplished what neither piracy, the American Revolution, nor the War of 1812 had managed to do—mortally cripple the New England whale fishery. The combination of colonial Atlantic transformations in sugar, slavery, and urban nights had served to accelerate a thirst for light that American whalers desperately quenched, riding it to the far corners of all four oceans for over a century. They sailed in hunt until that thirst for oil grew so great that the worlds the whalers made began to fray along their seams. By the 1840s, the flows of whale oil triggered by the on-board tryworks were no longer able to slake a thirst that had found new offerings and even greater appetites in turpentine, coal gas, and the second industrial revolution. It was not that whale oil was replaced in some evolution of technology. Rather, the hundreds of thousands of whales sacrificed in Atlantic lamps and candles had triggered visions of light that expanded and intensified faster than whalers could replenish the altars. Like much in this chapter, the crisis revolved around cotton, fire, and war. A few months before Hixson left his farm in Sharon to go whaling, a cotton factory

¹⁷³ Melville, "The Advocate," in *Moby Dick*, 116-120.

was built just down the road.¹⁷⁴ It was the first of its kind in Sharon, and it was part of a wider transformation drawing life from the webs of light spun by lucifers like Hixson.

This dialectical relationship, however, was hardly symmetrical, and it was hardly stable. As cotton plantations spread southwest into newly conquered lands and mills proliferated in New England during the antebellum period, the demand for oil began to overwhelm the fishery. Cotton mills, which consumed human labor and water power to produce, among other things, the cotton threads used to make candle wicks, hungrily devoured sperm oil. And it was not for light. According to the census of 1860, cotton factories “consume large quantities of sperm oil, each spindle using about half a gallon.”¹⁷⁵ Sperm oil may have produced a beautiful, odorless light, but its unrivaled properties as a lightweight, long-lasting lubricant meant that lamps were forced to compete with spindles for a limited resource.

The proliferation of cotton manufacturing in New England not only eclipsed the formerly privileged place of the whale fishery, it also meant that publicly illuminated cities were struggling to meet the rising costs of sperm oil. By the time New England cotton mills and Southern planters had careened the nation into an expansive territorial war with Mexico over the cotton lands of Texas, the spindles at home and abroad had grown so hungry that “very little sperm oil was available domestically for purposes of illumination.”¹⁷⁶

Under the assault of these spindles, webs of whale light were fast being respun into dark webs of lubrication. To make matters worse, however, in 1846 as Zachary Taylor led victorious American armies into Mexican lands being readied for slavery and cotton, Nantucket was

¹⁷⁴ Massachusetts Historical Commission, “Mann’s Cotton Mill Double Worker Housing,” MHC Inventory Form B, nos. 97, 98, 99, 100 (Town of Sharon, July 2008): mhc-macris.net.

¹⁷⁵ Quoted from Davis, Gallman, and Gleiter, *In Pursuit of Leviathan*, 345.

¹⁷⁶ Davis, Gallman, and Gleiter, *In Pursuit of Leviathan*, 345.

burning. Fire had always been a particularly present threat in a town literally flowing with oil, and extraordinary measures were sometimes taken to keep these flows from igniting. In 1838, the *Maria* having again returned to the Pacific, her agent, Christopher Mitchell, wrote reassuringly to his insurers that “We sent you this morning’s paper in which you will find some account of the late fire in this town. The loss is not so great, as was first anticipated.” More importantly, Mitchell wanted to demonstrate that everything had been done to keep his oilworks from burning, such that “several buildings were blown up by the fire department, ... all in the immediate vicinity of our oil-works.” Fire departments using gun powder to blow up buildings might sound rather extreme, but it “seemed to be the opinion of everyone that if the fire could be prevented from Communicating with our premises, a valuable portion of the town would saved.” Mitchell explained to the insurers that his neighbor Ames “has lost everything he possessed,” but Fisher, a ship-builder and wheelwright, “who owned the shop” across the street “has not; he still has his dwelling house & furniture left.” Not to be ungrateful, or perhaps feeling his neighbors’ disdain, Mitchell went on to write that they “were both very industrious men who were supporting large families by their daily labour,” and should “your office feel disposed to contribute to the losses of these individuals, or to the sufferers generally, it would give us great pleasure to be the channel of communication through which you might make your donation.”¹⁷⁷

In 1846, the town would not be so “lucky.” “The flames spread with such rapidity, as to baffle every exertion to repress them,” wrote “The Warder” for the *Boston Daily Atlas*. Desperately, they tried to halt the fire as they had done before, and “blowing up houses was resorted to, as the only means of arresting the conflagration; but it would seem, with little success.” Still, more “than TWENTY buildings are thus destroyed; and, indeed, many more would have been demolished, but

¹⁷⁷ Christopher Mitchell & Co. Papers, Letter Book 2, “Nantucket, 6th June, 1838. Saml. W. Seveté, Est. National Ins. Office, Boston.”

that all the powder in the place was consumed.” When this article was written, the fire was still raging and the “town presents a scene of devastation that language cannot describe,” and “the whole town is in such confusion that it is utterly impossible to arrive at” a true measure of the human and economic loss.¹⁷⁸ According to modern estimates, “over a million dollars in property was destroyed, one third of the island’s buildings were gone, and 800 islanders were homeless. All along the waterfront the fire, violently fueled by burning whale oil and tar, leveled wharves, counting houses, ropewalks, sail lofts, warehouses, and cooper shops.”¹⁷⁹

From that time onwards, the fishery became clearly centered in New Bedford. The threads of light through which whales had flowed were increasingly reworked into webs of industrial lubrication, as northeastern industrialists demanded sperm and whale oil for expanding mills and railroads. Cities, again following London’s example, began to replace sperm oil lamps with the far cheaper (at least once all the gas mains had been laid) and far more reliable coal-gas lamps. Between 1840 and 1860, the number of U.S. cities with gas lighting increased from seven to forty-one, driven in no small part by the discovery and mining of domestic seams of cannel coal (the best form of coal for gas lighting) in Pennsylvania, Kentucky, western Virginia, and Texas. Cotton spindles, meanwhile, continued to consume the flickering remains of the once luminous sperm whale fishery. By the 1850s, according to the authors of a recent study, the lubrication requirements for New England’s cotton spindles had exceeded one-hundred percent of the sperm oil available domestically.¹⁸⁰

All across the Atlantic world, spaces that had been born, sustained, and greased by whale lights seemed to be systematically prying loose their tethers to the fishery. In what the historian

¹⁷⁸ The *Warder*, “Great Fire at Nantucket: Awful Calamity,” *Boston Daily Atlas*, July 15, 1846.

¹⁷⁹ “An Island in Time..., ‘1846: The Great Fire,’ ” *Historic Nantucket* 49 (Winter 2000): 26.

¹⁸⁰ Davis, Gallman, and Gleiter, 346, 354-55.

Anthony Kaye has called the “juggernaut of the Cuban sugar economy,” planters embraced a fully industrialized slavery of rail, steam, and chemistry far ahead of most of the unfree (or free) Atlantic capitalist world.¹⁸¹ And although neither Kaye nor the historian of nineteenth-century United States sugar slavery, Richard Follett, mention it, part of this modernization of involved planters abandoning whale oil in favor of gaslight. A report to Parliament described Spanish Cuba in 1841 as a tropical gaslit hell revolutionizing slavery amidst the post-abolition ruins of the British West Indian sugar industry. With spiking sugar prices, and “considerable outlay of capital,” Cuban planters were expanding cultivation and manufacture “with an organization and completeness far exceeding anything heretofore attempted and perfected.” But perhaps most terrifying of all was the Cuban embrace of “the modern invention of coal-gas to obtain that artificial light by which the labours of the Cuban pandemonium, the crushing and boiling-house, might be carried on so long as human physical endurance, forced to its extreme extent by the lash of the driver, could carry it; the roads or paths from the cane-fields to the crushing and boiling-houses were even lighted with gas to enable the overwrought African slave to see his way to this human hell.”¹⁸² For all their anti-Spanish blustering, however, British hands were hardly clean here. Gaslit plantation factories, as impressive as they appeared, were not so much revolutionary breaks as extensions of processes begun generations earlier with the oppressive nocturnal union of sugar, slavery, and whale oil—a union held together and enthusiastically exploited by British planters, slave traders, and factory owners for decades until abolitionist and emancipationist movements tore it apart.

¹⁸¹ Anthony E. Kaye, “The Second Slavery: Modernity in the Nineteenth-Century South and the Atlantic World,” *Journal of Southern History* 75 (August 2009): 627-650.

¹⁸² Consul Campbell to the Earl of Clarendon, September 15, 1857, in *Class B., Correspondence with British Ministers and Agents in Foreign Countries, and with Foreign Ministers in England, relating to the Slave Trade, From April 1, 1857, to March 31, 1858, Presented to both Houses of Parliament by Command of Her Majesty* (London: Harrison and Sons, 1858), P.P 1857-58 (2443-I) lxi 240-38.

Rocked and strained by the rippling effects of war, westward expansion, emancipation, and industrial revolution, whalemens were also unraveling webs of whale light from within. In ports all across the Pacific world, they deserted in rising numbers, especially during 1849 when scores of whaling vessels lay completely empty in San Francisco harbor, crews abandoning ship to seek their fortunes in gold.¹⁸³ In 1859, the *Whalemens's Shipping List* complained bitterly that "our Courts should make an example of the desperadoes visiting New Bedford and securing berths on board our ships, is evident from the following statement of the burning of whale-ships, and mutinous conduct. The loss of property at their hands has been immense." The article went on to list mutinies, desertions, and thirteen deliberate burnings of whaleships by their crews over the previous decade and concluded hyperbolically that "Whaling masters in these days must go well-armed, and, expecting no favors at home, must exercise their own judgment for the maintenance of order, the preservation of peace, and protection of life."¹⁸⁴ By the antebellum period, the American whale fishery, already struggling to meet the insatiable appetite of cotton spindles, began to fray as labor relations on its dangerous, deep sea vessels grew increasingly antagonistic. Although the incredible demand from cotton manufacturing was driving up prices (and profits), wages were growing increasingly unequal, desertion became more common, and voyages grew longer as whales became harder to find. Finally, fewer Americans were willing to invest their lives, labor, and capital in the fishery given the better risks and returns of working and investing in textile and machine industries.

The fishery persisted, in much reduced form, but it had become a dark industry. No longer were whales, tryworks, and lamps spun together by the movements and labor of whaleships and whalemens. A new set of relationships had emerged. The dreams and spaces of

¹⁸³ Dolin, *Leviathan*, 211-212.

¹⁸⁴ "The Junior Mutineer," *Whalemens's Shipping List, and Merchant's Transcript*, July 12, 1859.

light, first triggered by the revolutionary union of ship and tryworks, survived and continued to expand. The new luminous webs of turpentine, bituminous coal, and hog lard—created from and through the unraveling of whale lights—had, meanwhile, begun to transform the antebellum United States even more dramatically. Their stories, and the lucifers who made them, form the subjects of the next three chapters.

CHAPTER TWO

Piney Lights: Turpentine Slaves, Seamstresses, and Perilous Antebellum Lamps

It was night in New York City, and so like tens of thousands of other women, Mary Clark and Ellen Cooley were at home busily sewing for their lives. Gathered around the shared light of a single lamp, the two women carefully plied needle and thread.¹ On the table before them, they had laid out the assembly pieces of men's common shirts, pre-cut to industry standards by skilled male cutters in the "cutting departments" of New York's clothing houses. Mary and Ellen, along with countless other New York women, were the outworking seamstresses who sewed the shirts together.² They did not so much make clothes as assemble them, and in this gendered division of labor across space, their job was simply to stitch. And stitch. And stitch. To put together just one of these shirts took around two thousand stitches and at least six hours of work. For their trouble, they could hope to earn, and sometimes hope was all it was, between 4 and 12 cents. These were starvation wages, but money their families desperately needed to meet the costs of living.³

¹ "A Double Casualty," *Commercial Advertiser*, June 17, 1858; "Chapter of Accidents—Woman Burned and Child Fatally Injured," *Evening Post*, June 17, 1858; "Accident from the Use of Burning Fluid," *New York Daily Tribune*, June 18, 1858.

² For recent social histories of women in the antebellum clothing industry, see Michael Zakim, *Ready-Made Democracy: A History of Men's Dress in the American Republic, 1760-1860* (Chicago: University of Chicago Press, 2003), 138-144; Christine Stansell, *City of Women: Sex and Class in New York, 1789-1860* (Urbana: University of Illinois Press, 1987), 106-119; Jean Boydston, *Home & Work: Housework, Wages, and the Ideology of Labor in the Early Republic* (New York: Oxford University Press, 1990), 82-83.

³ "Labor in New-York: Its Circumstances, Conditions and Rewards. No. I.—The Seamstresses," *New York Daily Tribune*, August 14, 1845; "Shirt Case. Additional Charges against Davis & Co.—More Human Sewing Machines in the Field," *New York Daily Times*, February 27, 1855; "The Case of Margaret Bryne," *New York Daily Times*, March 1, 1855; "Sewing Women," *New York Daily Times*, March 27, 1857; "Sewing and Starving," *New York Ledger*, December 12, 1863; "The Sewing Women and Their Employers," *Evening Post*, March 22, 1864; "The Sewing Women of New York. How Northern Philanthropy is Supported and Miscegenation Encouraged," *Daily Age*, March 23, 1864.

With laws, customs, and class politics so tightly circumscribing the respectable options for women's paid work, Mary Clark and Ellen Cooley had little choice but to sew, and so they were making, one stitch at a time, shirts that might mean their households could pay rent, eat, and survive one more week. Theirs were the needles stitching a revolution in ready-made men's dress. Theirs were the threads piecing together a democratization of men's access to the unpaid and underpaid domestic work of women traditionally realized only through marriage. Contracting with poor women like Mary and Ellen to sew garments at home for men to sell to other men in enormous clothing houses, clothiers disguised a revolution in production by keeping working women in their gendered place, and out of public view. It was a spatial process at once collectivizing and preserving the gendered labor relations of individual households whereby thousands of Northern women, working in domestic spaces for wages far below those of their husbands, fathers, brothers, and sons, made inexpensive clothes for hundreds of thousands of American men to wear on the street and on the job.⁴

This gendered politics, moreover, was made as much in time as in space. By 11 o'clock that night, if they had worked steadily (and perfectly) for eighteen hours, it was possible that Mary and Ellen were each on their third shirt of the day. More likely, however, given the incessant domestic work of husbands, children, cooking, and cleaning, they were only on their first or second shirts. Their straining eyes, aching necks, and sore fingers may have screamed at them to stop and wait until daylight. But that was not how this worked. To reach even the starvation-level wages they aimed for, Mary and Ellen had to stretch their labor deep into the

⁴ "Labor in New-York," *New-York Daily Tribune*, August 14, 1845; "Shirt Case," *New York Daily Times*, February 27, 1855; "The Case of Margaret Bryne," *New York Daily Times*, March 1, 1855; "Sewing Women," *New York Daily Times*, March 27, 1857; "Sewing and Starving," *New York Ledger*, December 12, 1863; "The Sewing Women and Their Employers," *Evening Post*, March 22, 1864; "The Sewing Women of New York," *Daily Age*, March 23, 1864; Zakim, *Ready-Made Democracy*, 138-144; Stansell, *City of Women*, 106-119; Boydston, *Home and Work*, 82-83.

night.⁵ And that meant cheap, (relatively) bright light. In the antebellum United States, as cotton spindles and heavy machinery spun whale oils away from lamps and into industrial lubrication, a new synthetic illuminant called camphene, or “burning fluid,” came to colonize and dominate that niche. A liquid mixture of spirits of turpentine and highly distilled alcohol, camphene materially connected the enslaved North Carolina men who tapped pines in remote forest turpentine camps (to produce nearly every drop of turpentine in the country) with the seamstresses burning that turpentine in nocturnal domestic workshops.⁶ As seamstresses like Mary Clark and Ellen Cooley reluctantly embraced the piney, enslaving means of their underpaid night labor, it meant they could meet the relentless cash demands of landlords, merchants, and families a little more reliably. It also meant risking their lives.

Having worked frugally for hours with only one wick burning, Ellen Cooley finally decided she needed more light to see her needlework. Reaching out “with the intention of lighting one of the wicks not then burning,” Ellen picked up the camphene lamp and tilted it down for the unlit wick to catch the flame of the other, “when a quantity of fluid ran out and ignited.” Terrified and singed, Mary Clark leapt up and “threw the lamp into the lap of Mrs. Cooley, where it exploded.” As sheets of liquid fire shot over the room, Ellen somehow managed to smother the flames consuming her dress and hair by wrapping herself up in some bed clothes. Mary Clark was not so lucky. Mary’s clothes immediately ignited, and she tore shrieking out of

⁵ Virginia Penny, *The Employments of Women: A Cyclopædia of Woman’s Work* (Boston: Walker, Wise, & Co., 1863), 296-98, 351; “Labor in New-York,” *New York Daily Tribune*, August 14, 1845; Methodist Protestant, “The Seamstress, or the Value of Labor,” *Boston Recorder*, October 15, 1846; C. L., “The New York Needle Woman,” *Advocate of Moral Reform and Family Guardian* 18 (September 1, 1852): 135; C. L. B., “Efforts for the New-York Poor,” *New York Daily Times*, November 2, 1852; *Boston Herald*, February 8, 1853; “Sewing and Starving,” *New York Ledger*, December 12, 1863; “The Sewing Women and Their Employers,” *Evening Post*, March 22, 1864; “The Sewing Women of New York,” *Daily Age*, March 23, 1864; “Working Women,” *Boston Post*, March 24, 1864.

⁶ Robert B. Outland III, *Tapping the Pines: The Naval Stores Industry in the American South* (Louisiana State University Press, 2004), 37-97; “Artificial Illumination.—Burning Fluids,” *Scientific American*, January 2, 1858, 133; “Camphene, Burning Fluids, &c,” *Scientific American*, October 8, 1853, 26; Harold F. Williamson, Arnold R. Daum, *The American Petroleum Industry: The Age of Illumination 1859-1899* (Northwestern University Press, 1959), 34-36.

the house and “through the street enveloped in flames.” Rushing to her aid as her “piercing screams alarmed the neighborhood,” a small group seized Mary, extinguished the flames, but not before she was severely burned. After being rushed to the city hospital, Mary Clark lingered in agony for over a month before finally succumbing to her burns. She was twenty years old. It was an altogether too common scene.⁷

Mary Clark and Ellen Cooley were casualties of class, gender, and light, but it was a light that history has largely forgotten.⁸ Forgetting camphene has also meant writing the white women who used it and the black men who made it out of the stories of who and what really mattered to the making of antebellum history. White women working in the home, but for a mass market, and black men working as slaves, but in an industry and place bearing little resemblance or proximity to a plantation, have appeared neither similar nor different enough from the stories contemporaries and historians have told about industry, gender, and slavery to attract much attention. But theirs were not sideshows. They were entangled in processes whose very invisibility allowed them to quietly underwrite the Northern and Southern worlds of white men, except for the moments when the materiality of piney light erupted violently into public view.

The explosive violence contained (and then suddenly not) in the era’s new camphene lamps made possible a political economy in which men’s safer days expropriated the work of women’s perilous nights. Without a cheap, portable illuminant like camphene, a revolution in

⁷ “A Double Casualty,” *Commercial Advertiser*, June 17, 1858, 2; “Chapter of Accidents—Woman Burned and Child Fatally Injured,” *Evening Post*, June 17, 1858, 2; “Accident from the Use of Burning Fluid,” *New York Daily Tribune*, June 18, 1858, 5; “Another Camphene Accident,” *New York Times*, July 24, 1858, 1; “Fatal Camphene Accident,” *New York Daily Tribune*, July 24, 1858, 7.

⁸ The most recent histories of light and night in America barely mention camphene at all. Jane Brox’s *Brilliant: The Evolution of Artificial Light* (Boston: Houghton Mifflin, 2010) devotes less than one page (78-9) to camphene. Peter C. Baldwin, *In the Watches of the Night: Life in the Nocturnal City, 1820-1930* (Chicago: University of Chicago Press, 2012) gives camphene one sentence (18). Maureen Dillon, *Artificial Sunshine: A Social History of Domestic Lighting* (London: National Trust, 2002), which would seem particularly well-aimed for a discussion of camphene, has no index entry and gives only a short paragraph (99).

urban domestic night work would have been inconceivable. But this was only part of the story. To accumulate the astonishing quantities of turpentine used to make camphene, planters brought whole new kinds of lands under the dominion of slavery in North Carolina's piney backcountry. Thus the making of piney light precariously enabled, at one end, white working-class women to hold on to a modicum of security and respectability as they made the worlds of white men, while at the other, dislocating black men from their tidewater communities as planters forced them to transform North Carolina's piney woods into living engines of turpentine and enslavement.⁹ This chapter investigates the sudden emergence, and the eventual sundering, of that surprising antebellum relationship between the New York seamstresses and North Carolina turpentine slaves who dipped, distilled, and stitched themselves together in the making of piney light.

The familiar story of the industrial revolution, which tells of an increasing concentration of workers and production in heavily capitalized, mechanized, steam-powered factories, was only half of the equation. This process of inward collapse was undergirded by an expanding diffusion of work and mass production into the internal frontiers of domestic spaces and piney woods, internal expansions securing the spatial, temporal, and social power of the masters of those domains (husbands and eastern planters) over those they claimed as *their* labor (women, children, and slaves)—workers who might otherwise have been pulled out of the home or west to the cotton belt. Why, after decades of research on the histories of women and slaves, does this pairing still seem surprising? The answers lie in the political visions of the past, in the ways the actual historical agents of these processes understood and explained what they were doing.

The North Carolinian planters who so enthusiastically pursued turpentine imagined themselves engaged in a counter-cotton project to save slavery from itself, and for themselves.

⁹ Outland, *Tapping the Pines*, 37-97.

They believed that by making turpentine valuable, they had made their slaves more valuable and less likely to be sold southwest to Mississippi. Planters thereby sought to secure their power and way of life in the coastal plain while reversing a population loss to the cotton belt they perceived to be weakening North Carolina politically and economically.¹⁰ The enslaved turpentine workers, in contrast, have largely been silenced by history, with no known surviving first-person narratives or oral histories. A product partly of the isolated, unfamiliar geography of labor that made permanent escape more difficult, this silence is also a consequence of the widespread agreement among both contemporaries and historians that the turpentine planters were right, and that they failed; that turpentine was a counter-cotton industry, and that cotton was and remained the central story of the antebellum South. Yet by reading against the grain of slaveholders' correspondence, it is possible to reconstruct the intentions and politics of at least some of the enslaved men who tapped the pines. Few were happy to be in the piney woods, forced to spend most of the year working in turpentine camps located miles and miles from their coastal plantation families and communities. But in at least one sense, their interests coincided with those of North Carolina planters in making the piney woods a valuable domain of slavery. The same forces that allowed planters to keep their chattel in the east meant that slave families were held together, at least during Christmas time, when the men returned from the camps to the plantations. Moreover, by carefully navigating and turning the geography and ecology of the

¹⁰ "The Turpentine Region," *Fayetteville Observer*, January 27, 1846; "The Pine Forests of North Carolina," *Raleigh Register*, August 29, 1849; Goldsboro Patriot, "Negro Hiring," *Fayetteville Observer*, January 6, 1853; *Fayetteville Observer*, January 6, 1853; "The Tide Turned," *Fayetteville Observer*, January 25, 1853; "High Prices," *Fayetteville Observer*, February 1, 1853; Turpentine Maker, letter to the editor, *Fayetteville Observer*, February 10, 1853; "Bad Policy," *Fayetteville Observer*, January 1, 1855; "A North Carolina Farmer," *Fayetteville Observer*, March 26, 1855; "The Cost of Living," *Fayetteville Observer*, April 12, 1855; "Shameful," *Fayetteville Observer*, April 30, 1855; "High Prices for Turpentine Hands," *Fayetteville Observer*, January 9, 1860; Outland, "Turpentine Boom," in *Tapping the Pines*, 37-59; Tycho de Boer, "Turp^t Is the Word!" in *Nature, Business, and Community in North Carolina's Green Swamp* (Gainesville: University of Florida Press, 2008), 55-86.

turpentine camps to their advantage, some slaves managed to carve out fugitive spaces in the many swamps secreted away in the piney woods.¹¹

White working-class New York men, meanwhile, believed that their exclusive rights to the unpaid labor of the women in their families were under threat from a capitalist revolution. As employers replaced skilled male artisans with machines and unskilled immigrants, women, and children, white men saw their patriarchal privilege slipping away, not to mention the depressing effect this had on their wages. White workingmen could, therefore, claim some small victory when their wives and daughters took in outwork as seamstresses. At least then, they could argue, their women were working in the home, and doing women's work—even if it was for other men—rather than laboring side by side with men in factories, like New England and Lancashire mill girls. For their own part, most of these women described their aims in accordance with, rather than in opposition to, the prevailing gender politics of the time. Public meetings of seamstresses and advocates for women's employment framed their demands for higher wages as issues of virtue and womanhood, arguing that “the low rates of pay which have so long prevailed, have undoubtedly driven many virtuous females to courses which might, otherwise, have been avoided.”¹² Others complained similarly that low piece-rates meant women had no time to properly keep house, and that it was unseemly for so many women to physically work so hard while growing numbers of male clerks engaged in undemanding labor better suited for the so-called weaker sex. Clothiers in New York (and, to a lesser extent, Boston and Philadelphia) were

¹¹ For a good overview of the historiography of nineteenth-century American slavery and its overwhelming focus on cotton, see Anthony E. Kaye, “The Second Slavery: Modernity in the Nineteenth-Century South and the Atlantic World,” *Journal of Southern History* 75 (August 2009): 627-650. For slaveholders' correspondence about turpentine camps, see especially James Redding Grist Business Records, David M. Rubenstein Rare Book & Manuscript Library, Duke University [hereafter, JRGBR]. For studies of the political geographies of turpentine slavery, see de Boer, *Nature, Business, and Community*, 64-69; Outland, *Tapping the Pines*, 60-97; David S. Cecelski, *The Waterman's Song: Slavery and Freedom in Maritime North Carolina* (Chapel Hill: University of North Carolina Press, 2001), 128-133.

¹² “The Working Women of the City,” *Evening Post*, March 7, 1845.

only too happy to exploit this tension in family politics, as it gave them access to the incredibly cheap labor and outsourced discipline of domestic women.¹³

Both the Northern and Southern white men in control of these processes of light and labor believed, or said they believed, that they were pursuing an alternative political economy to arrest the destabilizing and dislocating effects of what they saw as the dominant story of their times, the apotheosis of cotton slavery and cotton mills. The slaves and seamstresses trying to navigate this process, moreover, may not have completely disagreed. That turpentine camps and camphine-lit domestic workshops—spaces meant to escape and resist the ascent of cotton capitalism—only completed, in the end, the circuit of cotton in its movement from field to market as ready-made clothing was a paradox that few, if any, contemporaries or subsequent generations were willing to acknowledge, let alone explain.¹⁴

In the decades before the Civil War, slaveholders, merchants, manufacturers, and clothiers came to dominate the circulation of work and energy between forest and city, South and North, to wrench profit and power from the labor of slaves, factory hands, and women. Through this national process of producing and consuming piney light, moreover, Southerners secured the institution of racial slavery, men secured patriarchal privilege over women, and

¹³ “The Tailoresses—An Industrial Union,” *Public Ledger*, March 5, 1850; “The Sewing Women,” *New York Daily Tribune*, December 2, 1863; “Tremendous and Enthusiastic Meeting of Working Women,” *Daily Age*, January 20, 1865; Mathew Carey, “A Report on Female Wages,” and, “To the Ladies who have undertaken to establish a House of Industry in New York,” in *Miscellaneous Essays* (Philadelphia: Carey & Hart, 1830), 266-72, 278-82; Virginia Penny, *The Employments of Women: A Cyclopædia of Women’s Work* (Boston: Walker, Wise, & Company, 1863); *Six Hundred Dollars a Year. A Wife’s Effort at Low Living, Under High Prices* (Boston: Ticknor and Fields, 1867); Seth Rockman, *Scraping By: Wage Labor, Slavery, and Survival in Early Baltimore* (Baltimore: Johns Hopkins University Press, 2009), 100-193; Zakim, *Ready-Made Democracy*, 127-184; Boydston, *Home and Work*, 56-141; Blackmar, *Manhattan for Rent*, 109-148; Stansell, *City of Women*, 106-119.

¹⁴ These are not stories that have been told together. Histories of women in Northern industry have rarely looked beyond municipal or regional boundaries. Most of the scholarship has focused only on New York and New England. See, for instance: Stansell, *City of Women*; Boydston, *Home and Work*; Blackmar, *Manhattan for Rent*. Similarly, the few scholarly works on the antebellum turpentine industry have focused on either local North Carolina history or on the place of industrial slavery within a southern political economy dominated by plantation slavery: Robert S. Starobin, *Industrial Slavery in the Old South* (New York: Oxford University Press, 1970); Outland, *Tapping the Pines*; Tycho de Boer, *Nature, Business, and Community in North Carolina’s Green Swamp* (Gainesville: University Press of Florida, 2008).

Northerners and Westerners clothed a new white-male mass-democratic politics. This chapter explores the overlooked struggles of turpentine slaves and outworking seamstresses not only to uncover a forgotten light, but to reveal a hidden spatial and temporal politics at the heart of antebellum history. Because the gendered politics of outwork drove the primary production and accumulation of piney light more than supply determined demand, I begin with the seamstresses and their struggles around camphene lamps. The next section reconstructs the worlds that slaves, overseers, masters, and merchants made in the pine belt in the contested process of accumulating and moving turpentine. The final section examines how Southern turpentine was made into Northern camphene, and how the geography of piney light continued to expand until it collided headlong with the violence and revolution of the Civil War.

Stitching and Lighting an Industrial Revolution

By the antebellum era, more than four hundred clothing businesses had established themselves in New York, where they thrived in and helped to cultivate the city's central position connecting Atlantic and continental networks of trade and finance. New York clothiers, as the historian Michael Zakim argues, "integrated a textile revolution (the plethora of fabrics), a social revolution (the rise of wage labor in the metropolis), and a transportation revolution (by which canals, steam, and iron integrated a continental market)."¹⁵ Prices were plummeting while demand for respectable and democratic white male dress expanded from Broadway to Bowery to the South and West. At the same time, a local class monopoly over property meant that working-class New Yorkers found it increasingly difficult to own their homes and workshops, allowing landlords to charge exorbitant rents. Clothiers took advantage of these desperate conditions for working-class families to replace male in-house tailors with outworking female seamstresses paid

¹⁵ Zakim, *Ready-Made Democracy*, 38.

below-subsistence wages, and by the 1840s and 1850s, the enormously profitable clothiers of New York were employing hundreds of skilled male cutters and tailors, but tens of thousands of women like Mary Clark and Ellen Cooley.¹⁶

“There is many a song of the shirt sung in the garrets of our metropolis,” lamented one writer for the *New York Daily Times*, asserting it was “a fact proved, that the majority of our sewing women are working for starvation prices, with a fair chance of being defrauded at that.” What was worse was that this was a gendered poverty produced through a deliberate, managed market politics. Indeed, there was “a system about it; these fellows do everything by rule.” Whenever a merchant manufacturer needed some clothes to be made, “he tells his sharp clerk to get them done in the cheapest possible manner. They advertise, and women needing work, lured by the advertisement, apply.” These women, desperate for cash and forced to compete for work and wages with thousands of other women, first had to scrounge up a dollar or two as they “are required to leave money as a pledge for their honesty,—the thing seems fair enough, for they are strangers to the advertisers, and besides, they are glad to get work on any terms,—so they leave their dollar, make the coarse garments and return them to the store.”¹⁷

Tied to the store by their deposits, these women had to make the clothes in their homes, outside the supervision of their employers, and provide the rooms, needles, thread, fuel, and light, all at their own expense.¹⁸ The domestic workspaces of seamstresses were cramped, noxious, and frightfully expensive. According to contemporary accounts, seamstresses generally lived and worked in “a single room, or perhaps two small rooms, in the upper story of some poor, ill-

¹⁶ Zakim, *Ready-Made Democracy*, 127-156; Blackmar, *Manhattan for Rent*, 44-71, 183-249. See also: Stansell, *City of Women*; Boydston, *Home and Work*; Rockman, *Scraping By*.

¹⁷ “Sewing Women,” *New York Daily Times*, March 27, 1857.

¹⁸ “Shirt Case. Additional Charges against Davis & Co.—More Human Sewing Machines in the Field,” *New York Daily Times*, February 27, 1855; Methodist Protestant, “The Seamstress, or the Value of Labor,” *Boston Recorder*, October 15, 1846.

constructed, unventilated house in a filthy street, constantly kept so by the absence of back yards and the neglect of the strict inspector,” or “an attic room, seven feet by five, ... in which we found, seated on low boxes around a candle placed on a keg, a woman and her oldest daughter ... sewing shirts, for the making of which they were paid *four* cents apiece,” less than half that earned by the lowest-paid man.¹⁹ Another writer described the room where a New York seamstress and her daughters worked as “very small, not more than 12 feet by 6 feet,” and as he took a “seat near the window, the air which came in, involuntarily made me turn away; it was so full of a noisome smell from some drain or sewer behind the house.”²⁰ A visit to a seamstress living and working in a Mott street tenement painted a similar picture: “I then climbed the dark stairs, groping along, until feeling against a door, it opened, and I stumbled into a room. We rapped, but no one answered—when seeing a chink of light the other side, I passed through, descended two or three steps in a closet, and then came out in a low narrow room, shaped like a hall—perhaps fifteen feet long by four broad, with a window at the end. Near the window, at a table, with a dim tallow candle, sat a woman sewing shirts.”²¹

To secure the rights to use even rooms such as these—which had to function as both garment workshops and living spaces—“the tenants never pay less than three to four and a half dollars per month—and *pay* they must and do. Some of the very worst garrets, destitute of closet or convenience of any kind, and perhaps lighted only by a hole cut in the roof, rent as low as two dollars a month.” With piece rates ranging from about 4 to 12 cents per shirt over the antebellum period, and even the swiftest hands only able to complete three shirts “by working from sunrise to midnight,” the most that could be hoped to be earned in a week was never more than a third of a

¹⁹ “Labor in New-York,” *New York Daily Tribune*, August 14, 1845; *Boston Herald*, February 8, 1853; Zakim, *Ready-Made Democracy*, 129, 143-151.

²⁰ C. L., “The New York Needle Woman,” *Advocate of Moral Reform and Family Guardian* 18 (September 1, 1852): 135.

²¹ C. L. B., “Efforts for the New-York Poor,” *New York Daily Times*, November 2, 1852.

month's rent.²² Then, of course, "there were fuel and lights to buy," and, especially in the case of camphene, "with it all the terrible chances of sickness and accident."²³ Thus were the forgotten workshops of an industrial revolution in mass-manufactured, ready-made clothing—produced not with steam and iron, but hand and thread, concentrated not under one factory roof, but diffused through the urban landscape.²⁴

When seamstresses returned to the central clothing house depots with the finished shirts, pants, coats, cravats, and hats, they had to negotiate and carefully navigate their way through a blatantly uneven set of power relations determined by gender, class, and capital to even get the money they had been promised in exchange for their labor. Wage garnishing was common, and systematic intimidation meant that many women were never given back their deposit of \$1 to \$2, a sizeable sum for such cash-desperate families.²⁵ Merchants relied on their clerks to skillfully manipulate and intimidate working women, paying "the hands (a most suggestive term, by the way) according to their audacity, keeping the pledge of some on the pretense that the work is spoiled; refusing to pay others; and only paying those whose faces show that they are not to be trifled with. In this way the merchant gets his work done cheaply, and can afford to undersell his neighbors—and, as a matter of course, the people buy of him."²⁶

In the large stores, at least, the giving and receiving of work, sometimes for as many as 4,000 women, took place on only one day each week. On this designated day, a clothing store transformed into a strange market manufactory. "No seats are provided; a long file of women are

²² "Labor in New-York," *New York Daily Tribune*, August 14, 1845.

²³ C. L., "The New York Needle Woman," *Advocate of Moral Reform and Family Guardian* 18 (September 1, 1852): 135.

²⁴ For a similar and extended argument, see, Zakim, *Ready-Made Democracy*, 125-156.

²⁵ "The Case of Margaret Bryne," *New York Daily Times*, March 1, 1855; Methodist Protestant, "The Seamstress, or the Value of Labor," *Boston Recorder*, October 15, 1846.

²⁶ "Sewing Women," *New York Daily Times*, March 27, 1857.

waiting their turn to be served,” described one observer. Meanwhile, a “single clerk is detached from the large corps of assistants in the store to attend” to the line of women seeking work and pay. The first woman in line then approached the clerk, “and tremblingly offers her work for his inspection; he picks up the neatly made garments, handles them roughly, grumbles at the stupidity of these women in not doing something which he never has told them to do, perhaps swears a little by way of variety, hands the frightened woman another bundle of work and her money, and passes on to the next.” Repeated over and over, merchants and clerks managed this theatrically performed domination and resistance of women, until the “clock strikes four; no more work can be received, and those who are unfortunate enough to come after that time are forced to trudge home again to wait another week.”²⁷

By thus controlling and dividing the spaces of exchange (clothing houses) from the spaces of production (domestic spaces), a typical clothing house employed and disciplined between five and six hundred outworking seamstresses, who took home, assembled, and returned over 3,000 shirts each week, with many larger houses employing and producing triple that number.²⁸ In direct contrast to what most narratives identify as the major spatial processes of capitalist industrialization, the twinned revolution in ready-made clothing and camphene put work out rather than pulling workers in, and was made in the forest and home, rather than the mine and factory. Putting-out and turpentine camps were the spatial configurations that clothiers and camphene manufacturers used to cut past the power of free white working men, while accessing and combining (in camphene-lit outwork) the two cheapest and politically weakest sources of labor in the antebellum United States: domestic women and slaves outside the cotton belt.

²⁷ “Sewing Women,” *New York Daily Times*, March 27, 1857.

²⁸ “The Case of Margaret Bryne,” *New York Daily Times*, March 1, 1855.

Pressed into domestic outwork by a spatial revolution in the clothing industry, women like Mary and Ellen were consigned to *night* work by an equally powerful temporal politics. During the antebellum decades, city governments and industrialists collaborated to build gas lighting systems that assertively illuminated the commercial and bourgeois cores of American cities. Embedded in the cityscape with retorts, factories, gasometers, and pipes, gas lighting systems were certainly impressive. But their direct reach remained relatively limited for most of the century. Mostly restricted to the shops, factories, theaters, and homes of the elite near the commercial centers of cities, gaslights served two main functions. First, they served as class markers, indicating respectability, success, and security. Second, and more importantly, business owners used gaslights to anchor and expand select spaces in time, to create fixed working days tied to the clock, not ones left adrift on seasonal tides of darkness and light. For many workers, this meant traveling in early morning darkness from a poor neighborhood in the periphery to the wealthy urban core. There they would work a set number of hours in a factory, shop, or clerk's office that their employer kept lit and running by firing up gas lamps as needed to compensate for the vagaries of sunlight. At work by sunrise and kept past sundown, most workers arrived and left in darkness. In a parallel process, the tenements, boardinghouses, and shanties into which urban regimes of property crowded laborers also became illuminated longer and more brightly than previously, but with an important exception: the domestic night spaces that workers appended to the diurnal day were produced with camphene rather than gas.²⁹

This was equally true of the clothing industry. The clothing houses themselves, usually narrow, deep spaces extending back from the street, would also have been dark spaces but for the scores of gas lamps brilliantly illuminating the shopping floors and in-house cutting departments

²⁹ Blackmar, *Manhattan for Rent*; Sven Beckert, *The Monied Metropolis: New York City and the Consolidation of the American Bourgeoisie, 1850-1896* (New York: Cambridge University Press, 2001); Baldwin, "Lighting the Heart of Darkness," in *In the Watches of the Night*, 14-33.

staffed by male clerks and cutters. According to the historian Michael Zakim, the owners of Lewis & Hanford, one major New York “clothing palace” that employed 4,000 persons (mostly as outworkers) in a typical week, prided themselves on having no fewer than 112 gas burners to light the premises.³⁰ Nor were these wholly male spaces. Gaslight pressed and held women in garment factories too. As Virginia Penny, a keen observer of nineteenth-century women’s work, noted, “What magnificent buildings there are in New York devoted to the sale of gentlemen’s wear! But to think they are made of the sinews and muscles and tears and sighs of hardworking women, and to see the clerks in the stores, with nothing to do but receive and wait on customers, while those poor girls on the fifth floor are toiling from early morn to dark to earn less than one half of those clerks!”³¹ The centralized and integrated factory stores that formed the nation’s great antebellum clothing houses were certainly spaces produced and circumscribed in time through the use of gaslight. The vast majority of the work of manufacturing these clothes, however, took place far removed in time and space, and rather than from “early morn to dark,” many New York needlewomen were “compelled to toil from dewy morn—not to dusky eve, for of that she might not complain—but to the tired hour of midnight; and out of it all gain a scant supply of the mere absolute wants of life, at the sacrifice of all company, relaxation, and with the fearful penalty of broken health.”³²

The extension of the working day into the evening, after all, pushed more than leisure into darkness. Many women worked as servants during the day and were forced to put off their vital, if often overlooked, domestic work until well past sundown. Many others, like Mary Clark, faced an inversion of the working day, scrambling to keep house during the day while trying to

³⁰ Zakim, *Ready-Made Democracy*, 100.

³¹ Penny, *The Employments of Women*, 345.

³² “Working Women,” *Boston Post*, March 24, 1864.

accomplish their waged piecework at night.³³ Cramped and noxious, a seamstress's domestic workshop also had to function as a nocturnal space, and as one writer described, the "light by which she had been working still burned on the table, a little camphene lamp, so faint that I could hardly have read a small type with it." Notwithstanding its dimness, this camphene lamp was the light by which she "worked from *five* in the morning 'till *eleven* at night ... Her eyes had failed her, she said, during the last winter, from working so long by lamp-light."³⁴ Yet considering that the alternative was an even dimmer, smellier, dirtier tallow candle, a camphene lamp, even a dim camphene lamp, was something many seamstresses worked hard to obtain. Teams of related needlewomen sometimes coordinated to relay the work of sewing over night and day by forming night shifts for shirt making. As Virginia Penny observed, in places "where there are two or three or more women or girls engaged in this enterprise of making shirts to enable gentlemen to appear respectable in society, they absolutely divide the night season into watches, so that the claims of sleep may not snatch from the grasp of the shirt manufacturers an iota of their rights. In this way, by working about twenty hours a day, the amazing sum of \$2.50, and sometimes \$3, is earned per week," a wage still no more than a fourth of what a male cutter could command, and less than half of the six dollars a week considered a viable living wage.³⁵

For most New York seamstresses, however, even if they survived their volatile camphene lamps, the temporal politics forcing them to work night after night became more than they could bear. The clothing industry, according to some commentators, was literally a murderous one, needling women to death by relentlessly driving them through time, and although many "talk of women getting a *living* by the needle—the truth is they get their *death* by it." As the *New York Ledger*

³³ Boydston, *Home and Work*, 88-92, 113; Blackmar, *Manhattan for Rent*, 115, 123, 136-137; Zakim, *Ready-Made Democracy*, 127-184.

³⁴ C. L., "The New York Needle Woman," *Advocate of Moral Reform and Family Guardian* 18 (September 1, 1852): 135.

³⁵ Penny, *The Employments of Women*, 351; Zakim, *Ready-Made Democracy*, 144.

admonished, “it would seem that hundreds of employers are engaged in a conspiracy to starve thousands of women down to the lowest point of atrophy consistent with the use of their fingers, and to keep them in that condition till they die. The sewing machine, ticking all day long and far into the night, is the death-watch that heralds their doom, and the merciless task-masters for whom they toil are, to all intents and purposes, their *executioners*.”³⁶

In these domestic night spaces, outside the glow of the expensive new gaslight systems, a replacement for cheap and portable whale oil was desperately needed, if not exactly welcomed by the women who must then labor by its light. “Not many years ago,” observed *Scientific American* in 1858, “the only fluids employed in our country for household light were animal oils obtained by perilous adventure on the stormy sea with monsters of the deep.” Yet the spindles and engines of the industrial revolution so consumed these fluids that “whale oils are in comparatively limited use for illumination, and are becoming more limited every year.” Sperm oil may not have had any rivals in quality “among all the burning fluids, but it has become so dear that cheaper substitutes have been sought and obtained.”³⁷ Usually, this story of democratizing light has been told through kerosene and the Pennsylvania petroleum boom that began in 1859. Decades before petroleum was struck at Titusville, however, the burgeoning working-class populations drawn into antebellum cities—often to labor around those same whale oil-consuming spindles and engines—found new, cheap domestic lights in camphene.

By the antebellum period, camphene was the most widely used lamp fuel in America. Camphene was not only cheaper than whale oil, it was brighter and cleaner, leaving little of the sooty residue that oil lamps would deposit over a room. It was a light of bourgeois sensibilities and working-class thrift. And unlike some other illuminants at the time, such as pure turpentine

³⁶ “Sewing and Starving,” *New York Ledger*, December 12, 1863.

³⁷ “Artificial Illumination.—Burning Fluids,” *Scientific American*, January 2, 1858, 133.

or coal oil, the addition of volatile alcohol allowed camphene to be burned in any ordinary oil lamp. For those households and businesses that could not afford sperm oil (at more than twice the cost) or the still rare and capital-intensive gas lighting systems, camphene was the overwhelming favorite.³⁸

It was also incredibly dangerous, and this danger was not distributed evenly. Seamstresses, servants, apprentices, women, and children were far more likely to handle the work of making and tending lights than their masters or husbands. As Mary Clark and thousands of others would discover first-hand, the volatile mixture of alcohol and turpentine that made up camphene was highly explosive, even when handled properly under the safest conditions. This was not something most people had any familiarity with. Wood might snap or crackle as it burned, and when oils and tallows were spilled, they could certainly cause intense fires. But they didn't explode. Oil lamps would not instantly envelope someone in flame who was refilling their basins or lighting a wick, as happened to Mary and Ellen. Indeed, because of its extreme volatility, handling a camphene lamp in the antebellum period became, by most measures, one of the deadliest activities of the industrial age, widely cited as killing more people than steamboat and railroad accidents combined.³⁹ In the words of one outraged editorial, the "progress of the age, and the ingenuity of man, have introduced no engines of destruction so potent as camphene" and all so-called burning fluids, "and could the yearly victims of these latter-day monsters be gathered in one pile, it would present a mammoth hecatomb, compared with which the heaps slain by

³⁸ Camphene, also called "burning fluid" or "spirit gas," was defined as a liquid mixture of one part spirits of turpentine and four parts highly distilled alcohol (88-95%). 55th Cong., 2d sess., Report no. 411, *Alcohol in the Manufactures and Arts*, December 17, 1897 (Washington: Government Printing Office, 1897), 375-381; "Camphene, Burning Fluids, &c," *Scientific American*, October 8, 1853, 26; Harold F. Williamson, Arnold R. Daum, *The American Petroleum Industry: The Age of Illumination 1859-1899* (Northwestern University Press, 1959), 34-36.

³⁹ See especially the records kept and reported by E. Meriam, of Brooklyn Heights from 1850-1860, for instance, E. Meriam, "Deaths and Injuries from the Use of Camphene," in *The New-York Almanac and Weather Book for the Year 1857* (New York: Mason Brothers, 1857), 114-122.

steam explosions and railroad accidents, would be as ant hills to the Egyptian pyramids.”⁴⁰

Editorial hyperbole aside, the deadliness of camphene light was real enough. Stories of gruesome deaths by camphene circulated through the nation's newspapers, usually accompanied by an outraged and incredulous demand to know, “When will people cease to use this infernal stuff?”⁴¹

The struggle over the meaning and control of women’s domestic work in an industrializing city certainly contributed to Mary Clark’s death. But she was also killed specifically by camphene, and the story of camphene was far more than an urban story. The story of camphene was as much about slavery as about wage labor and as much about industrialization in Southern frontiers as in Northern cities. Seamstresses navigating dangerous domestic night work in New York and turpentine slaves trying to survive labor camps in North Carolina forests were not, no matter how contemporaries and historians have treated them, separate stories. They were both part of the story of piney light.

Illuminating Pines

At its most basic level, the ecology of piney light flowed through the following continually contested cycles: primary production commenced with longleaf pines capturing solar energy; social accumulation proceeded with enslaved workers scoring the pines and collecting the resin that trickled from the wounds; social production began at the camp distilleries where expert slaves transformed resin into turpentine and rosin; social production continued in urban factories where wage workers further purified the turpentine, distilled corn whisky into near-pure alcohol, and mixed the two to make camphene; and social consumption concluded with the burning of camphene in lamps. As neat as this sounds, however, these abstract cycles occurred only because

⁴⁰ “Camphene,” *Daily Cleveland Herald*, April 28, 1855.

⁴¹ “Another Camphene Murder,” *Daily Cleveland Herald*, January 12, 1859.

of the work of real living actors with widely diverging interests in perpetuating these energy webs linking forests, stills, and (mostly) urban lights. Nor could or did this web of work and exchange happen just anywhere or at anytime.

Practically every drop of turpentine in the United States originated south of the Mason-Dixon line and, with the exception of some small subsistence producers in North Carolina, depended almost entirely upon the labor of slaves. These slaves were overwhelmingly young black men, raised in the plantations of the coastal plain, and drawn most heavily from the Carolinas. For piney light to exist, for it to be an engine of power and profit for slaveholders, managing the first link in the chain was absolutely critical. They would have to compel groups of thirty or more enslaved men, separated from their plantation communities for most of the year, to live and labor alone in the woods extracting the resin of millions of trees. Managers experimented with a range of disciplinary techniques, while slaves were just as inventive at resisting and asserting some small control over their lives and their labor. The overlapping and locked struggles to draw turpentine, life, and profit from the piney woods rolled over the antebellum South, pulling railroads and steamships deep into the backcountry, transforming rivers, and entangling swamps and forests in new geographies of freedom and slavery. Camphene breathed new life into eastern slavery by bringing a new sort of sandy, swampy, piney terrain under its dominion and opening up a huge new frontier of accumulation that came nowhere near reaching its limit by the eve of the Civil War.⁴²

In the 1840s, North Carolina planters were transforming naval stores, a marginal backwoods industry worked by small, poor, mostly white producers, into a booming slave-based engine of light. Naval stores was an ancient industry, once encompassing all the materials needed

⁴² Outland, *Tapping the Pines*, 3, 37-121.

to build and maintain ships, but by the colonial period consisted mainly of tar, pitch, turpentine, and other products made from the wood of resinous pines. Not particularly profitable, naval stores in the Americas were centered early on in the piney woods of North Carolina, where the sandy and swampy soil supported little agriculture. The demand for tar and pitch by navies and maritime industries was considerable, but it was the discovery in the 1830s that spirits of turpentine could be mixed with alcohol to produce a bright, cheap illuminant that catapulted naval stores to prominence. Getting tar and pitch only required gathering and slowly cooking wood from the longleaf pines. Turpentine was far trickier. First, teams of laborers had to “box” the pines in the winter (hack a collecting space into the base), then “chip” them in the spring (scrape off the bark above the box and cut into the sapwood to make the resin run down into the box), then “dip” the resin (or gum) from the boxes into barrels, get the barrels to a distillery, and finally distill out the volatile spirits of turpentine.⁴³

Rosin, the thick carbon-rich material left after the spirits had been distilled, also found new uses as a lubricating oil for the heavy machinery of New England cotton mills and briefly as the source of an illuminating gas. As rosin oils (mixed with the increasingly scarce sperm oil) drove the power looms of Lowell mills, it transformed rosin from waste to treasure. “Until lately vast quantities of rosin were thrown away as worthless,” noted one article, when “Ditches were filled with it in North Carolina where pine forests cover immense tracts of country, it was used to make hard paths, and to form a pavement for wharves.”⁴⁴ The fractional distillation of raw pine resin, therefore, channeled rosin into lubricating (with sperm oil) the New England looms weaving the cloth that New York women then sewed by turpentine light.

⁴³ Outland, *Tapping the Pines*, 8-59.

⁴⁴ “A Great Discovery for North Carolina,” *Fayetteville Observer*, July 29, 1852; “The Diamond Light,” *Fayetteville Observer*, March 1, 1855.

Had industry boosters understood the degree to which the success of North Carolina turpentine was, in fact, intertwined with that of cotton, it would have struck many as decidedly ironic. In 1846, a Fayetteville paper celebrated the effects of the turpentine boom, where land values “have risen, one, two, or three hundred per cent.; negroes have risen probably fifty per cent. ... In the lower part of Bladen, hands hired from \$125 to \$161. A gentleman who had gone to Wilmington to sell his turpentine, in pocketing \$1900, remarked that that sum was the produce of the labor of four hands.” By bringing the once-marginal piney woods fully under the dominion of slavery, moreover, North Carolina planters believed they were finally regaining control over a geography of labor dominated by the massive gravitational pull of the Cotton Kingdom, “and for the first time, probably, many persons from the upper counties are moving down. The tide of Western emigration may be said to have ceased entirely.”⁴⁵ In 1849, another North Carolina paper claimed the “ ‘crop’ of naval stores, in proportion to the capital and labor employed, is a far greater and more certain one than either sugar or cotton, and is gathered without the use of any thing else than an axe to tap the trees, and a tub to collect the turpentine.”⁴⁶ By the 1850s, turpentine producers were hiring slaves from other planters at rates from \$150 to \$200, and sometimes as much as \$300 per year, whereas “Hands for the tobacco factories are only offered \$75 to \$100; on public works \$140 to \$150. On farms \$120 to \$130.”⁴⁷ Instead of selling slaves west to Mississippi, now coastal planters could hire their chattel out to the piney woods, where the “discovery of the value of our pines, aided by our plank roads, has

⁴⁵ “The Turpentine Region,” *Fayetteville Observer*, January 27, 1846.

⁴⁶ “The Pine Forests of North Carolina,” *Raleigh Register*, August 29, 1849.

⁴⁷ “Negro Hire,” *Fayetteville Observer*, January 2, 1854; Goldsboro’ Patriot, “Negro Hiring,” *Fayetteville Observer*, January 6, 1853; “High Prices,” *Fayetteville Observer*, February 1, 1853; Turpentine Maker, letter to the editor, *Fayetteville Observer*, February 10, 1853; Tarboro’ Southerner, no title, *Fayetteville Observer*, December 22, 1853; “Bad Policy,” *Fayetteville Observer*, January 1, 1855; Wash. (N. C.) Dispatch, “Hired Negroes,” *Fayetteville Observer*, January 9, 1860; “High Prices for Turpentine Hands,” *Fayetteville Observer*, January 9, 1860.

worked a wonderful change within the last few years. Formerly many moved off to the South and West, and none came from abroad. Now, many come and none go.”⁴⁸

By the 1850s, naval stores constituted the third largest export from the South as a whole (after cotton and tobacco), with North Carolina producing 96 percent of that total.⁴⁹ *De Bow's Review* estimated that in 1847 around five thousand slaves extracted more than 800,000 barrels of resin, valued at \$2,000,000, from North Carolina's piney swamps.⁵⁰ By 1860 that figure had leaped to \$5,311,420 for North Carolina out of a total \$7,409,745 for the South, worked by nearly eight thousand hands.⁵¹ James R. Grist was one of a handful of large producers who came to dominate the naval stores industry as it tied itself to urban lamps in the 1840s and 1850s. Owning and hiring well over one hundred slaves, the Grist family was matched by only a few others. Most slaves would have worked in smaller camps, but whether directly or indirectly, large producers began to take increasing control over the thousands working in North Carolina's 1,600 turpentine operations by renting lands, hiring slaves, and monopolizing ownership of the much smaller number of distilleries scattered through woods and concentrated in Fayetteville and Wilmington. Spanning half a million acres of pines (a forest plantation the size of Rhode Island), fifty million boxes, 150 stills, and producing nearly one million barrels of resin annually, these antebellum turpentine camps formed the frontiers of piney light. To properly understand the strange geography of turpentine requires close attention to people and place, and so I tell the

⁴⁸ “The Tide Turned,” *Fayetteville Observer*, January 25, 1853.

⁴⁹ Gloria Vollmers, “Industrial Slavery in the United States: The North Carolina Turpentine Industry 1849-1861,” *Accounting, Business & Financial History* 13:3 (November 2003): 374.

⁵⁰ Outland, *Tapping the Pines*, 40.

⁵¹ Percival Perry, “The Naval-Stores Industry in the Old South, 1790-1860,” *The Journal of Southern History* (Nov., 1968), 524; Outland, *Tapping the Pines*, 41.

story through the Grist family business, which was not only one of the frontier industry's wealthiest, but left one of the richest archival records.⁵²

Enslaving Piney Frontiers

During the winter of 1850, thirty slaves began to transform a section of forest into the newest colony of the Grist turpentine empire. Axes in hand, they fanned out alone over dozens of acres to cut boxes into the trunks of tens of thousands of pines. They were the advance guard of a new frontier of slavery, and James R. Grist had sent his cousin Benjamin Grist one hundred miles upriver from Wilmington to oversee the development and discipline of the nascent turpentine camp.⁵³ As they boxed, the slaves were ripping open access to vast vertical streams of solar energy stored by the pines in the form of resin, but they were also tearing through woody layers of human and natural history. Centuries of Indians and Europeans firing these woods for hunting and agriculture had prevented hardwoods from colonizing the region, and produced an ecology in which the fire-adapted longleaf pine thrived as part of what the historian Tycho de Boer has called “a ‘sloshy union’ of two distinct ecosystems where longleaf pine savannas sat shoulder to shoulder with poquosin swamps and Carolina bays.”⁵⁴ By the antebellum turpentine boom, many of the poor whites who had once fired and used these piney woods to produce tar and a

⁵² Outland, *Tapping the Pines*, 41-42, 45, 69; de Boer, *Nature, Business, and Community*, 75. I decided to focus my narrative and research on the Grist operations for their comprehensiveness, the richness of the sources, and, most of all, because they provide the best window into the lives and work of the enslaved. All indications are that the Grist operations were typical of the larger players in industry. Smaller turpentine crops would have worked very similarly, but would have brought their crude resin to a still owned by one of the larger producers, like the Grists. Other valuable manuscript collections include the following at the David M. Rubenstein Rare Book & Manuscript Library, Duke University: Tillinghast Family Papers; Daniel W. Jordan Papers; A. J. Turlington, Papers; William H. Turlington, Papers; William R. Smith, Memorandum Book, 1852-1855; Francis Harper Papers. See also the following collections at the Southern Historical Collection, The Wilson Library, University of North Carolina at Chapel Hill: Mercer Family Papers, #2990-z; Grimes Family Papers #3357; Thomas David Smith McDowell Papers #460.

⁵³ Benjamin Grist to Allen Grist, St Pauls P.O., January 21, 1851, Box 2, Folder: Correspondence Series [hereafter CS] 1845-1852, JRGBR.

⁵⁴ Tycho de Boer, “The Corporate Forest: Capitalism and Environmental Change in Southeastern North Carolina’s Longleaf Pine Belt, 1790-1940” (PhD diss., Vanderbilt University, 2002), 28.

marginal independence had been compelled by colonizing planters to become fire fighters in exchange for retaining squatting rights.⁵⁵ These were not “new” lands that had somehow escaped history, but they were new to slavery.

To recreate the power relations of slavery was, therefore, of pressing concern for overseers. Their preliminary weapons were geography and gender. New turpentine recruits faced a radically unfamiliar terrain, arriving in the remote, uncultivated camps with little knowledge of how to find food, water, and shelter in such landscapes. Furthermore, producers selected only young men, torn from their plantation communities. The odd slave woman in a turpentine camp did not work out in the trees, but instead remained near the distillery to do chores for the overseer, most likely under the continual threat of rape. A slave named Sophie lived with her children in the Grist camps from at least 1853 to 1859, and gave birth to at least one child in that time.⁵⁶ Her exploited presence in the camps, moreover, would only have further underscored the gendered division of space and the power that white men could claim over black bodies.⁵⁷

And Benjamin Grist’s first task was to transform those bodies into turpentine slaves, and pines into boxes. Boxing was more than the first step in the extraction of resin. It was a transformative act seizing control of the biological processes of pine trees, a surgical modification of a tree forcing it to collect its own vital energy in an easily accessible gouge. Rather than simply consuming the trees’ accumulated vital energy by killing and disassembling, like in whaling or lumber industries, turpentine trees had their work and energy stolen slowly over many years. Only living trees could produce resin. Only alive and boxed would they be energy tools through

⁵⁵ Outland, *Tapping the Pines*, 15-19, 63.

⁵⁶ William Willox to James R. Grist, October 13, 1853, Box 3, CS 1853-1854, JRGBR; M. Jones to James R. Grist, Grist Depot, August 29, 1858, Box 3, CS 1857-August 1858, JRGBR; M. Jones to James R. Grist, Grist Depot, August 14, 1859, Box 3, CS May-October 1859, JRGBR.

⁵⁷ David S. Cecelski, *The Waterman’s Song: Slavery and Freedom in Maritime North Carolina* (The University of North Carolina Press, 2001), 110.

which slaves and slaveholders could convert sunlight into lamp fuel. “If we enter, in the winter,” Frederick Law Olmsted wrote of his journey through the Southern states, “a part of a forest that is about to be converted into a ‘turpentine orchard,’ we come upon negroes engaged in making boxes, in which the sap is to be collected the following spring.”⁵⁸ To effectively reroute and lay claim to the sunlight flowing through the pines, slaves had to thread their labor between the trees’ own vital cycles. “Box the tree after the sap is gone down and stop before it rises,” advised one article. This meant boxing was winter work, beginning sometime in November and ending in March. Winter was the time to make slaves into boxers and pines into solar tools, forced to give up the products of their biological work for the rest of their spring and summer lives, and “therefore it will require more hands to box than it will to work the trees.”⁵⁹ Boxing required strength, precision, and time. But most of all, it required slaves and training.

“I am cuting boxes with all of the beast hands + giting timber + distiling with the ballans,” Benjamin Grist wrote to James R. Grist’s father and business partner, Allen Grist. He was also having some trouble with “a good manny Green hands,” as they were “hard to learn to cut boxes.” Nevertheless, he wrote confidently that by the time Allen or James visited, “I will have all of the Green hands larnt how to box.”⁶⁰ This crucial training likely involved more experienced slaves teaching the new arrivals somewhere near the still, as the “green hands” were almost certainly also the “ballans” distilling the resin. When Frederick Law Olmsted toured the region, he observed “the green hands doing ’prentice work upon any stray oaks, or other *non*-turpentine trees they can find in the low grounds.”⁶¹ The new slaves were kept at the low grounds for

⁵⁸ Frederick Law Olmsted, *A Journey in the Seaboard Slave States, With Remarks on Their Economy* (New York: Dix & Edwards, 1856), 339.

⁵⁹ “The Manufacture of Turpentine in the South,” *DeBow’s Review*, May 8, 1850, 452.

⁶⁰ Benjamin Grist to Allen Grist, St Pauls P.O., January 21, 1851, JRGBR.

⁶¹ Olmsted, *A Journey in the Seaboard Slave States*, 339-40.

supervision, education, to make use of their labor in the still, and, as Olmsted emphasized, to keep them away from the valuable pines. If the lucifers-in-training were going to botch a box, it was better that they ruined an oak (which was most valuable dead, anyhow) than cut short the life of a longleaf pine. While alive and properly modified, such a pine could act as a spigot of liquid light for over ten years.

“I am just from Robeson,” James R. Grist wrote to his father a couple weeks later, and “they were cutting good boxes + no mistake.” Eager to expand his turpentine empire, “I have sent B. Grist every hand I could possibly spare,” but James feared that even more labor would be needed to thoroughly domesticate the forest. “You must send Isacc Arden + Bill out to Benjamin as early as you can,” he urged his father, and asked that extra measures be taken to recover a slave who had been “out” from Benjamin Grist’s camp for at least three weeks. “I think Stephen Norcom will come in to you,” and so “you must make an effort to get him in,” for, James emphasized, “we scarcely have hands enough to work the business.”⁶² It was time to tighten the control over labor and focus on boxing, “for you may take my word that the Rosin is going to be very high this year + I am detetermined to have every man box cut I can; for Robeson is the place to make money + this is the year to push hard.”⁶³ Slaves trained, disciplined, dislocated, and in place, the actual work of boxing could proceed.

⁶² James R. Grist to Allen Grist, Wilmington, February 4, 1851, Box 2, CS 1845-1852, JRGBR. “Norcom” was the surname of Harriet Jacobs’ master, indicating that Stephen probably grew up in Edenton, NC, a town located in Albemarle Sound. This is supported by the appearance of only one Stephen Norcom living in NC, and that he resided in Washington, NC (near Edenton), in the 1870 and 1880 US Census (see ancestrylibrary.com). Stephen was therefore likely witness to (or had heard of) Dr. James Norcom’s relentless and vindictive attempts to force Harriet Jacobs to consent to his sexual advances, a practice common throughout the South and likely reproduced for the even more vulnerable black women living in the camps. See Harriet Ann Jacobs, *Incidents in the Life of a Slave Girl* (Boston: Linda Brent, 1861); and Jean Fagan Yellin, *Harriet Jacobs: A Life* (New York: Basic Civitas Books, 2004).

⁶³ James R. Grist to Allen Grist, Wilmington, February 4, 1851, JRGBR.



Figure 2.1. Cutting a box. (Source: U.S. Forest Service.)

“These ‘boxes’ are not made of boards, nailed together in a cubical form, as might be supposed,” Frederick Law Olmsted observed, and “nor are they log-troughs, such as, at the North, maple-sap is collected in. They are cavities dug in the trunk of the tree itself.” To do this, slaves used a long-handled ax, “made in Connecticut, especially for this purpose.” As Olmsted witnessed with the green hands learning on sacrificial oaks near the still, boxing took practice. The boxes, which would each hold about a quart, were cut into the trunk between six inches and foot above the roots, and were “shaped like a distended waistcoat-pocket.” The point of all this was to steal life, not kill, and so the “less the ax approaches towards the centre of the tree, to obtain the proper capacity in the box, the better, as the vitality of the tree is less endangered.” Experience meant precision as well as speed, and an “expert hand will make a box in less than ten minutes; and seventy-five to a hundred—according to the size and proximity of the trees—is considered a day’s work.”⁶⁴

⁶⁴ Olmsted, *A Journey in the Seaboard Slave States*, 339-40.

In channeling resin out of the tree, boxes were exposed to the elements and had to be carefully placed in relation to how sun, sap, water, wind, and human bodies moved through the forest. One turpentine producer recommended that the “trees should be boxed at least 18 inches from the ground, so as not to be overrun by heavy rains, and for greater convenience in dipping also.”⁶⁵ Another claimed it was best to go “down the stump of the tree so as to cut the heart as little as possible.”⁶⁶ The problem of cutting a box too high was that the exposed face above the box had to be extended higher throughout the season and each year. The higher the box, the quicker before the new face was out of reach. Too low and water and wood chips would collect in the boxes, while some slaves chaffed at the painful labor of bending over to hack low on the tree. Boson, one of Grist’s slaves, who “said he could not hack low boxes,” was moved from Robeson to the older operation at Brunswick (where boxes had already been cut years before), revealing some of the competing and contradictory forces that turpentine operators had to navigate and consider in the woods.⁶⁷

Boxing, like most turpentine work, was solitary task labor, and each slave was laboring to create a hundred acre, sunlight-channeling engine of resin and enslavement powered by himself and several thousand trees. “Green hands to commence cutting boxes, say the 1st of November, would cut by the middle of February,” estimated one writer, “from five to six thousand boxes, which are about as many as they could tend well the first year” and while there “are many hands in North Carolina who tend 7,500 to 9,000 boxes for their tasks, making 300 barrels” or more of resin, “they are the brag hands of the country.”⁶⁸ Benjamin Grist was, in a sense, forcing the

⁶⁵ DeBow’s Review, “Manufacture of Turpentine in the South,” 453.

⁶⁶ DeBow’s Review, “The Manufacture of Turpentine in the South,” 452.

⁶⁷ James R. Grist to Mr. Perry, Robeson P.O., September 9, 1850, Box 2, CS 1845-1852, JRGBR.

⁶⁸ DeBow’s Review, “Manufacture of Turpentine in the South,” 453.

slaves under his command to lay the material foundations of their own prisons. There was no inherent economic or natural reason that turpentine had to produce this kind of isolating, individualized geography of labor. After the Civil War, turpentine was almost always done in teams, and appears to have been more efficient at producing turpentine.⁶⁹ But this was never just about most efficiently coercing trees to give up their resin. It was always equally about preserving and reproducing slaveholders' power over their human property, keeping slaves from congregating by carving an individualized task system into the landscape itself.

The political dictates of this isolated exploitation, moreover, introduced considerable contradictions into the labor process, not least of which was oversight. Overseers like Benjamin Grist only ever knew a small portion of what was going on in the camps, as the slaves responsible for boxing, chipping, and dipping the resin out of crops extending over thousands of acres could never be monitored all at once. Dividing the forest into crops to be tended by individual slaves, M. Jones, the overseer at Grist Depot (not to be confused with Benjamin Grist's "Gristville" camp), like many operators, employed an account book to record the outputs of each crop.⁷⁰ According to research by the economic historian Gloria Vollmers, many other overseers used account books to record more finely grained surveillance of slave labor, even measuring daily work. Examining the "Tillinghast Family Slave Task Book," Vollmers shows how at the Tillinghast operations, slaves designated as "drivers" were responsible for organizing and monitoring the daily labor of about ten slaves, each of whom was tasked with cutting about 50-60 boxes a day. Overseers managed and monitored this labor through weekly quotas and with daily measurements. Each day, either drivers or "tallymen" rode through the forest making note as

⁶⁹ Outland, *Tapping the Pines*, 78-86; Outland, "Industry Challenges, Old and New," chap. 5 in *Tapping the Pines*, 122-161; Outland, "Labor, Forced and Free," chap. 6 in *Tapping the Pines*, 162-206.

⁷⁰ M. Jones, "Account Book, 1856-1859," David M. Rubenstein Rare Book & Manuscript Library, Duke University.

slaves sang out a word upon completing a box.⁷¹ It was not just difficult, lonely, unevenly supervised work. It was also dangerous. While the slaves were at work chipping the trees, “Gorge Smaw hurt his hand” by badly slicing it with a specially designed tool called a “hacker + will not doe any more worke in 4 or 6 weeks.” Apparently scared that the same would happen to him, another slave named Homer told Grist he was going to get some water, but just “lade done his hacker + left ... + he has not bin seene since.” A slave named Ben, meanwhile, had “not cum in.” This was a phrase found in nearly all the letters that James R. Grist’s overseers wrote to him, and meant that a slave had run away some time before but was expected to eventually return.⁷²

The work of transforming pines into piney light always emerged through a seasonal struggle to get resin out of the trees without letting too many slaves escape for too long. Producers realized that the advantage they held during winter months could rapidly evaporate with spring thaws, and so they pushed hard to complete boxing new crops before the weather warmed and a new geography of slavery was opened. In September of 1850, the Grist turpentine complex was just beginning to migrate inland along the Cape Fear River from Wilmington, but this unavoidable tension between the need to control slaves and the need to allow those slaves to labor away from continuous supervision was already fully apparent. “Your letter was received informing me that Uncle Lathams boys come into him,” James R. Grist wrote from his turpentine camp, and “he did not wish them punish’d for this offence.” “I shall strictly comply with his request,” he continued in agreement, but not without some frustration, for “at the same time I shall endeavour to show to him + satisfy him of the fact that several of his boys have behaved very badly this year without any just cause.”⁷³ He agreed that the runaway slaves should

⁷¹ Vollmers, “Industrial slavery in the United States,” 382-383.

⁷² Benjamin Grist to James R. Grist, Gristville, April 22, 1852, Box 2, CS 1845-1852, JRGBR.

⁷³ James R. Grist to Mr. Perry, “Roberson P.O.,” September 9, 1850, JRGBR.

not be punished, but not because he was a kind man; he simply understood that the geography of labor in the camps made for different rules.

Running away was common, especially once the boxing season ended. One of the slaves mentioned in the letter, Richmond, ran away from the camp in Robeson, so James “took him to Brunswick.” Trying to use geography as discipline, he had Richmond work with slaves he knew from Latham’s plantation, but again, “he runaway from me + could not be managed, was caught in onslow county, + I sent him up to Roberson again + you see he is determined not to work any wheres.” Fearing that some of Latham’s other slaves would try to run, James admitted “it is true that I suffered Boson Boston + Daily + Lewis to work in Brunswick,” but only “because they all had wifes there + Boson said he could not hack low boxes.” The rest he kept up in Robeson, as “the other boys preferd working up” there and “because the woods was decidely more pleasant + better to work in.”⁷⁴ This was not evidence of benevolence or mercy. By trying to meet some of the desires of his slaves, James R. Grist was really trying to prevent further labor losses.

It came as something of a surprise to James, therefore, to hear that his brother William Grist had whipped Joe and Abner, two slaves who had always done good work, simply for running away. “We work altogether by task in our business,” James explained, and “those same boys always gained Saturday,” meaning that Joe and Abner both finished their work quotas a day early every week. Yet, James wrote, “I understand that some of the negroes said Joe received 500 lashes; Will whiped him + Abner with a small leather strap,” which he saw as a foolishly counterproductive punishment. Not only was James “satisfied there has not been 500 licks struck in the business this year,” but Abner and Joe were “the only two that has been thrashed since we quit cutting boxes + they were whiped for running away + not there work.” Boxing took place

⁷⁴ James R. Grist to Mr. Perry, “Roberson P.O.,” September 9, 1850, JRGBR.

entirely in the winter months when running away had to be weighed against freezing or starving to death. Given the seasonal terrain of violence, labor, and life, whipping slaves for cutting boxes either too slowly or too poorly was largely an incentive to work harder and better. In other words, whipping for poor work, at least during the winter, was something James R. Grist preached and practiced. And if he could punish slaves for running away, he would do so, but “we have never whiped any negro that *come in to us* when runaway.”⁷⁵ The reluctance to punish slaves for returning to the camps, for running *in* with their badly needed labor, demonstrated the power slaves held in the peculiar geography of turpentine country.

Making a Geography of Light

The struggles of boxing began the extension of an enslaved frontier, but it was the battles to clear and control transportation routes through the difficult terrain that made the piney woods into a truly extractive landscape. Two years after the boxing had commenced under Benjamin Grist, a steamer departed from Wilmington, slowly pulling a shallow flat-bed boat, heavily laden with hundreds of bushels of corn, up the Cape Fear River towards his camp. The slaves manning the ship were winding their way deep into a country being transformed by the accumulation of piney light. Beyond the swampy banks of marsh and cypress blurring the edge of the shallow river, thick groves of longleaf pines extended for miles in all directions, their scarred and chipped trunks the material signs of years of industry. The job of the slaves on the steamship was to bring food cultivated by slaves on the Atlantic coast to slaves laboring in the turpentine camps a hundred or so miles upriver, far from any agricultural land. From the deck of the steamer, here and there a slave might be seen or heard hacking expertly into the face of a tree to make a box at

⁷⁵ [Italics mine.] James R. Grist to Mr. Perry, “Roberson P.O.,” September 9, 1850, JRGBR.

the base or dipping the resin that had collected in boxes into barrels.⁷⁶ After a few days, the flat boat reached the turpentine camp that was its destination, but Benjamin Grist was hardly pleased to receive it. Writing angrily to his cousin James, Benjamin complained that although “I received the corn by Banks,” it had suffered in its journey, “over 100 bushels of it is [wet]” and all of the bags that had been “laide on the botom of the flat [the boat] was wate + sproted threw the bage + 10 bushels of the luse corne was weat.”⁷⁷

The business of extracting light from pine trees was, indeed, a watery one. Just about every aspect of the industry depended on successfully navigating and channeling the rain, rivers, and resin that flowed, largely outside of human control, through the piney woods. Not enough rain and the river would be too low for transport. Too cold or dry and the resin would not run. Too much rain and the boxes would overflow while the woods turned to mud so thick none of the resin could be hauled to the still. Without enough rain the corn would never have reached Benjamin Grist, but the recent rainfall described in his letter was also most likely the reason it was ruined.

The making of piney light was a process of spaces, people, and energy continually, unpredictably pushed apart and forced back together like some kind of unwieldy, miles-wide turpentine pump. As the spaces joining trees, barrels, stills, and ports were drawn, erased, and redrawn in the piney woods, resin and slaves were coerced into motion and reined to a stop. And nothing did more to determine the rhythm and shape of this churning geography than the rising and falling of the rivers linking and separating frontier turpentine camps and Atlantic coastal centers. “I understand the water is rising somewhat the river,” wrote James R. Grist to his father. “We have had a great dl of rain in Brunswick + Wilmington,” he added, “but will write you

⁷⁶ Benjamin Grist to James R. Grist, “Gristville,” April 22, 1852, JRGBR.

⁷⁷ Benjamin Grist to James R. Grist, “Gristville,” April 22, 1852, JRGBR.

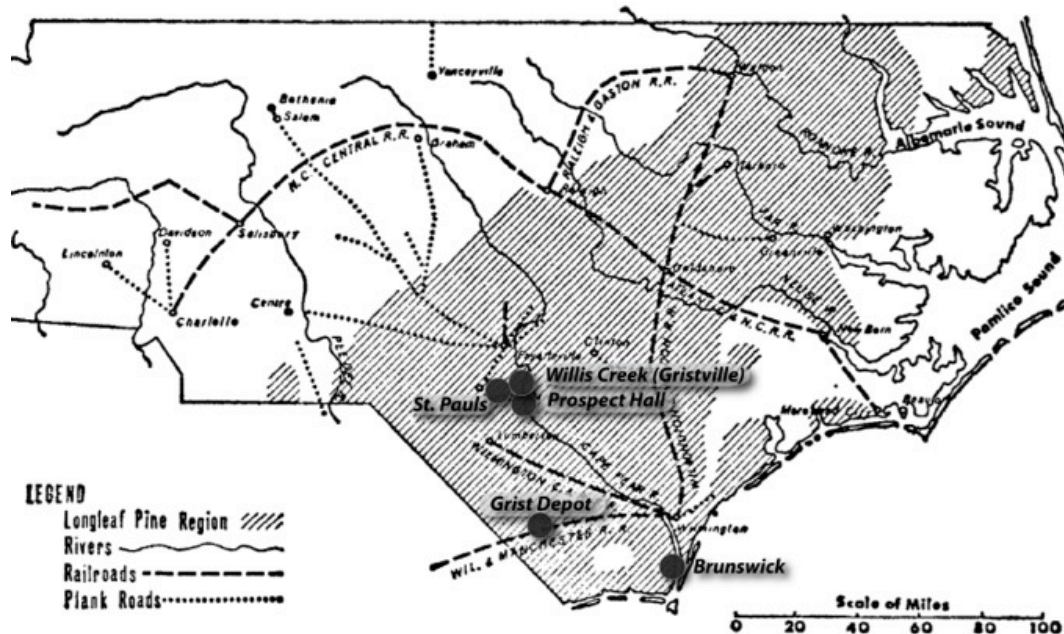
more fully about the river when mail comes in this morning.” He was concerned because the river was the supply line ensuring that Benjamin Grist and the slaves under his control had the means to continue producing turpentine.

Controlling how barrels and provisions circulated in the unpredictable river could bring enormous profits, and this led to fierce competition among shipping lines and river towns. Frontiers, however, did not just happen. They had to be made and maintained. Wilmington had supplies and wanted turpentine. The turpentine camps had turpentine and wanted supplies. In 1856, for instance, twenty-five slaves labored at the turpentine camp at Grist Depot (located along the Wilmington and Manchester Railroad) to dip and scrape 7,709 barrels of resin, distilling and shipping 900 barrels of turpentine and 4,323 barrels of rosin east to Wilmington. To power and supply the means of this labor and production, the Grist family shipped to the camp 44 barrels of pork, 175 sacks of meal, 100 pairs of shoes, 26 bales of hay (for the mules to haul the turpentine), 4 boxes of hats, 3 barrels of glue, 4 kegs of nails, 2 boxes of dippers, 1 box of axes, 38 files, and 1 cooper’s adze.⁷⁸

Promoters and shippers who saw riches in resin organized competing and complimentary projects of canals, steam, railways, and plank roads to bring the forest to market and the market to the forest. But it was a “regional improvement” with extraordinary human costs. These visionary projects pulled hundreds of slaves into the horrific, backbreaking work of cutting pathways through thickets of scrub, roots, trees, and vines; and all this in order to begin the equally unendurable tasks of dredging canals, clearing rivers, and building roads in the hot, muddy, swampy, mosquito-ridden terrain through which turpentine moved. Canal digging, as the historian David Cecelski writes, was “the cruelest, most dangerous, unhealthy, and

⁷⁸ M. Jones, “1856—Received from Wilmington,” in “Account Book.”

exhausting labor in the American South.”⁷⁹ For the 55 to 200 slaves owned or hired by the Cape Fear Navigation Company to work on river improvements, life was somewhat better, as they tended to live on ships and away from swamps. But whether working on river, canal, railroad, or plank road, the labor was unsparingly harsh, and all too often rendered meaningless as a newer route or technology bypassed an older.⁸⁰



Map 3. The turpentine region of North Carolina, showing Grist camps in operation from 1850-1860. Base map and legend from Percival Perry, “The Naval Stores Industry in the Old South, 1790-1860,” *Journal of Southern History* 34 (November 1968), 515.

In the 1850s, Fayetteville, located about 120 miles upriver, and Wilmington, situated at the mouth, emerged from this brutal wave of frontier-making as the two major poles of turpentine country. Fayetteville was as far up the river as a steamboat could travel before it hit the falls and, in order to amplify its geographic significance, Fayetteville’s promoters employed slaves to build a network of plank roads radiating out into the piney woods. These paths turned

⁷⁹ Cecelski, *The Waterman’s Song*, 109. For more on the politics and labor of early republican canals, see Peter Way, *Common Labour: Workers and the Digging of North American Canals, 1780-1860* (Cambridge, 1993).

⁸⁰ Cecelski, *The Waterman’s Song*, 109-116.

the wood of the forest against itself, expanding the industry to previously inaccessible pines and strengthening Fayetteville's dominance in the region.

Industrialization and urbanization were never just processes confined to city limits. The plank roads that became briefly popular in North American forestry regions during the second quarter of the nineteenth century were key technologies in making frontiers of urban accumulation. Plank roads—like rail, aqueducts, and shipping routes—were what made cities and industry possible. Frontiers made cities. Cities made frontiers. The word “frontier” does not usually call to mind North Carolina, especially as late as the 1840s. Frontiers are supposed to describe large, contiguous borders, easily drawn onto continental maps, and something like a settler frontier did in fact expand west across North America in the nineteenth century.⁸¹ At the same time, however, the combined capital and social power of Southern planters and Northern industrialists were pushing rail, steam, and labor armies upriver and inland from coastal centers into backwoods and undeveloped lands. And in propelling energy and labor against what the political anthropologist James Scott calls “the friction of terrain,” new resources were made accessible to coastal economies.⁸² The archipelagos of camps and distribution centers that formed this new geography were the industrial frontiers powering a new urbanization, and spatial technologies like plank roads were critical to their operation.⁸³

Plank roads were exactly what they sounded like: wooden paths built in the forest, cut from the trees around them. At a time when Wilmington was building the longest railroad in the country from the mouth of the Cape Fear westward to Manchester, South Carolina,

⁸¹ For a good introduction to the many problems with the frontier concept, see William Cronon, “Revisiting the Vanishing Frontier: The Legacy of Frederick Jackson Turner,” *The Western History Quarterly* 18 (April 1987): 157-176.

⁸² James C. Scott, *The Art of Not Being Governed: An Anarchist History of Upland Southeast Asia* (New Haven: Yale University Press, 2009).

⁸³ Michael Williams, *Americans & Their Forests: A Historical Geography* (New York: Cambridge University Press, 1989).

Fayetteville's plank roads seemed decidedly un-modern. Yet whatever their resemblance to some idea of modernity, both transportation projects mobilized large teams of laborers and engineers to extend and stabilize the geographic reach of the rivers flowing out of the piney woods. It was through such geographies that producers extracted the material means of building and powering urban and industrial spaces. Just as camphene and outwork seemed less modern than coal gas and factories, plank roads were eclipsed by rail. But the point is that they, too, coexisted. They, too, worked with and against each other to create antebellum modernity.⁸⁴ Plank roads were more reliable and easier to repair than the dirt paths that flooded or turned to mud when the river rose. Railroads like the Wilmington and Manchester did even more to circumvent the seasonal nature of rivers, but here they too functioned mainly to drain more traffic back towards Wilmington and the Cape Fear River. Through networks of steam, rail, and plank roads, regional entrepreneurial elites made the Cape Fear River into the central artery in the geography of turpentine.⁸⁵

Railroads and steamboat lines wanted to exploit this division of energy. Their success captured clearly one of the central contradictions in the continuous fracturing and reassembling of turpentine space: the instability made the geography vulnerable, but it also concentrated power and wealth into the hands of those few who could most effectively move and exchange energy across a dangerous patchy terrain. "Could you persuade your friend Mr Pritchett to give us his freighting business on the Cape Fear River," asked the steamboat operator J. Banks of James R. Grist, a major client. Pritchett was a supplier to the camps, and so the letter continued,

⁸⁴ For a discussion of slavery, the South, and global modernity, see Kaye, "The Second Slavery"; Walter Johnson, *River of Dark Dreams: Slavery and Empire in the Cotton Kingdom* (Cambridge: Harvard University Press, 2013).

⁸⁵ Outland, *Tapping the Pines*, 49-55; Percival Perry, "The Naval-Stores Industry in the Old South, 1790-1860," *The Journal of Southern History* 34 (November 1968): 509-526; Robert B. Starling, "The Plank Road Movement in North Carolina: Part I," *The North Carolina Historical Review* 16 (January 1839): 1-22; Starling, "The Plank Road Movement in North Carolina: Part II," *The North Carolina Historical Review* 16 (April 1839): 147-173.

“We can offer as many inducement to Naval Store shippers as any Co on the River,” such as that “all Spirits stored in our warehouse is covered by insurance until it is shipped,” and even more importantly, the “St. Douglass as you know has been rebuilt + is now probably the best + highest draft Boat on the river, so that shippers need be under no apprehension of stuff having to ly on the River Bank when the water happens to be low.”⁸⁶ James R. Grist convinced his suppliers to use Banks’ lines and so grateful were the Banks brothers to have secured a portion of this vital circulation of energy that a week after they wrote the letter from Fayetteville, the newly rebuilt *Douglass* arrived in Wilmington renamed as the *James R. Grist*.⁸⁷

In the 1850s, Wilmington manipulated steamers, rail, and Fayetteville’s plank road network to gain control of the spaces and energy of the region, and so managed to overtake Washington and New Bern as the capital of the naval stores industry. The Tar and Neuse rivers that fed into the original North Carolina naval stores centers were too shallow for steamships, and Wilmington exploited its advantage on the Cape Fear by pushing production further upriver and inland. At least as important was the development and manufacture of copper stills. Like the tryworks onboard whaling ships, copper stills made possible the accumulation of turpentine farther from processing and trading centers on the coast, allowing producers to push camps deeper into the forest where slaves could distill onsite.⁸⁸ Steamers like the *James R. Grist*, then, were able to gather spirits and rosin from all over an extensive region into massive docks and warehouses, making Wilmington into one of the greatest reservoirs of artificial light on earth.

They also helped make Wilmington into the flammable epicenter of an already extraordinarily flammable geography. The owners of the 34 stills in Wilmington in 1845,

⁸⁶ T. Banks to James R. Grist, Fayetteville, August 15, 1854, Box 3, CS 1853-1854, JRGBR.

⁸⁷ “Steamer James R. Grist,” *Fayetteville Observer*, August 28, 1854.

⁸⁸ Outland, *Tapping the Pines*, 49-54.

capitalized at \$87,000, held a slave labor force worth \$66,000, paid \$6,000 in overseers' wages, and spent an additional \$83,750 to run the distilleries as they consumed over 200,000 barrels of resin to produce spirits of turpentine and rosin valued at more than \$400,000.⁸⁹ There was no doubt that the concentration of turpentine in Wilmington brought tremendous wealth to the city's merchants and manufacturers. But there was also no doubt that this process continually threatened to burn the city to the ground. In and around Wilmington from 1842 to 1857, there were at least twelve distillery fires and six fires in turpentine sheds destructive enough to threaten the city and make their way into newspaper reports.⁹⁰

In April of 1844, a fire on Wilmington's wharves destroyed 4,000 barrels of turpentine, "two or three shed buildings, a warehouse, and some lumber" for a loss of \$8,000.⁹¹ Less than a month later, a distillery fire spread all the way to the turpentine sheds by the river, destroying thousands more dollars worth of turpentine.⁹² In 1842, "Henry Nutt's Turpentine Distilleries, situated near the Rail Road Depot," was completely destroyed after "a small blaze was discovered near one of the furnaces" around midnight. Along with all the buildings, "more than a thousand barrels of raw turpentine, and thirty or forty barrels of the spirits" were consumed in the flames, and the "distilling apparatus was also much injured. Mr. Nutt's loss is probably nearly or quite six thousand dollars." As firemen and slaves battled the midnight fire and kept it from

⁸⁹ Wilmington Chronicle, "Statistics of Wilmington," *Fayetteville Observer*, September 24, 1845.

⁹⁰ Wilmington Chronicle, "Fires," *Fayetteville Observer*, February 2, 1842; "And Yet Another!," *Raleigh Register*, May 24, 1842; "Fire in Wilmington," *Fayetteville Observer*, April 24, 1844; "Fire," *Raleigh Register*, April 30, 1844; Wilmington Chronicle, "Fire," *Fayetteville Observer*, May 15, 1844; Wilmington Chronicle, *Raleigh Register*, January 13, 1846; *Fayetteville Observer*, November 24, 1846; *Fayetteville Observer*, June 1, 1847; Wilmington Chronicle, "Fires," *Fayetteville Observer*, April 9, 1850; Wilmington Journal, "Fire," *Fayetteville Observer*, May 27, 1851; *Fayetteville Observer*, July 31, 1851; Wilmington Journal, "Fire," *Fayetteville Observer*, November 11, 1852; Wilmington Journal, "Fire," *Fayetteville Observer*, January 27, 1853; Wilmington Journal, "Fire," *Fayetteville Observer*, August 18, 1856; "Fires in Wilmington," *Fayetteville Observer*, September 17, 1857.

⁹¹ "Fire in Wilmington," *Fayetteville Observer*, April 24, 1844; "Fire," *Raleigh Register*, April 30, 1844.

⁹² Wilmington Chronicle, "Fire," *Fayetteville Observer*, May 15, 1844.

spreading much beyond the distillery, the *Wilmington Chronicle* felt it necessary to remark “that the slave portion of our population should be commended for their exertions on these occasions, as on all similar ones.”⁹³ In other words, the slaves forced to risk the dangers of production were also forced to risk combatting the premature eruption of fires intended to be shrunk, divided, and “safely” burned in lamps.

Cities like Wilmington, Fayetteville, Washington, and New Bern, the central depots gathering the products of the piney woods, were, however, only the most conspicuous nodes in a flammable process of accumulation stretching from camps to rail cars to steam ships. In 1845, an unusually dry summer encountered a pine forest littered with resin and chippings from the work of turpentine makers, sparking such tremendous fires that a “number of runaway negroes, who have been in the Swamp for years, have been forced to return to their masters, to escape the flames.”⁹⁴ A decade later, a wildfire leapt from plantation to plantation, turpentine camp to turpentine camp, destroying over 300,000 turpentine boxes in one neighborhood and an estimated 50,000 barrels worth of resin in Duplin, Bladen, and Brunswick counties. The flames “swept along over leaves, grass, trees, fences and houses, as fast as a man could run. In one case a negro man, with a load of wood in his wagon, was so hard pressed that he had to take his horses out and fly for life, leaving the wagon and wood to be consumed.”⁹⁵ A New York woman on a trip to Fayetteville was similarly caught, and tried to flee ahead of the conflagrations, but her party was soon cut off by the awesome power of a turpentine forest on fire. “Our horses were

⁹³ *Wilmington Chronicle*, “Fires,” *Fayetteville Observer*, February 2, 1842.

⁹⁴ “Fire in the Dismal Swamp,” *Fayetteville Observer*, April 23, 1845.

⁹⁵ “Destructive Fires,” *Fayetteville Observer*, March 12, 1855; “Fires,” *Fayetteville Observer*, March 19, 1855; “Terrific Fires in the Pineries of Carolina,” *Fayetteville Observer*, March 22, 1855; “Fire in Bladen County,” *Fayetteville Observer*, April 16, 1855; “The Fires in the Woods,” *Fayetteville Observer*, April 19, 1855; “The Fires in the Woods,” *Fayetteville Observer*, April 26, 1855; “The Fires,” *Fayetteville Observer*, April 30, 1855; “Forest Fires,” *Fayetteville Observer*, May 3, 1855.

held, and we gazed upon the scene with mingled terror and admiration,” she later wrote, “for every moment it increased in magnitude and brilliancy, until the whole heavens seemed one glow of lurid light. A few steps onward and before us gleamed a spectacle terrific in sublimity. We were nearly belted by a burning forest. The tall pines reeking with turpentine, lay against the sky—towers of living coals. The night was dark, and the effect of these gorgeous crimson piles was fearfully grand.”⁹⁶

Moving turpentine could be just as dangerous, and the routes of piney light were continually under threat of fire. On a train on the Wilmington and Manchester Railroad in June of 1858, “a spark from the chimney of the engine, which, falling upon an open car in which was a lot of Spirits of Turpentine in a leaky condition, it took fire immediately.” The flames spread so rapidly “that, before anything could be done to prevent it, four open cars, one box car, the tender and a part of the engine,” as well as a part of the track itself were destroyed, a destruction made worse by the fact the fire broke out while passing over a bridge, and “it was necessary to first pass the Bridge and save that from destruction, before any attention could be given to the burning train.”⁹⁷ A year later, a similar disaster took place on a river steamer, when on a Saturday evening, just after the captain “had left the deck and gone to his supper, it was discovered that the Spirits of Turpentine was on fire, there being on board 460 casks, and 60 bbls. Rosin. The fire spread so rapidly that Capt. McRae seeing no other chance but to run the boat ashore, did so and landed his crew and himself in safety. A portion of the crew however, had to jump overboard and swim ashore to prevent being burned. The steamer continued to burn until she sunk, where her hull now lies in 10 feet water.”⁹⁸As seamstresses in New York and the

⁹⁶ “A Northern Lady’s Impressions,” *Fayetteville Observer*, April 5, 1855.

⁹⁷ Wilmington Herald, “Burning of Freight Cars on the Manchester Railroad,” *Fayetteville Observer*, June 24, 1858.

⁹⁸ Wilmington Herald, “Steamer Rowan Burnt,” *Fayetteville Observer*, September 8, 1859.

enslaved makers and movers of turpentine could all painfully attest, the inescapably flammable materiality of making piney light invariably fell hardest onto those who could least resist, while the potential rewards were reserved for those who had pressed them into peril.

Bleeding the Pines: Chipping, Dipping, Surveillance, and Resin

Before the merchants, manufacturers, and masters of Wilmington and Fayetteville could dominate the volatile circulation of light, however, that energy had to be pulled out of the trees. Slashing boxes through the woods began the contested process of collecting piney light, but there still remained the formidable task of getting the resin from the trees through a complicated, shifting geography to the stills. This translocation was the labor dominating the warmer months of the year from about March through October, and to coordinate the transfer of energy, managers first reordered the forest to make it legible to both overseers and slaves. “[B]efore proceeding to dip,” *DeBow’s Review* recommended, “each task, where there are no natural boundaries, should be marked off by blazing a line of trees. And every task should be further divided by rows of stakes, fifty yards apart, crossing it both ways, from side to side, which will cut it up into squares of about half an acre.” This was done for reasons of power as much as efficiency, for without “this the overseer of several hands cannot possibly inspect their work with any accuracy, nor can the hands, however faithful, avoid skipping a great many boxes in *cornering, chipping, and dipping*.”⁹⁹

Boxing and staking were like the work of building, labeling, and priming an engine, but that engine still had to be turned on. Pines would only leak resin if the tree were injured. To get the pines to channel resin into the boxes, slaves had to flay and wound the trees, a process called variously chipping or hacking. The precious resin was a thick, energy-rich substance excreted by

⁹⁹ “Turpentine. Hints for those about to Engage in its Manufacture,” *DeBow’s Review*, October 19, 1855, 486-7, italics in the original; “Product of Turpentine at the South,” *DeBow’s Review*, September 11, 1851, 303.

ducts in the wood to protect the tree from diseases and insects when the bark and outer layers were damaged. Resin was a response to continually renewed violence, and this fact fundamentally shaped the labor of the industry.¹⁰⁰



Figure 2.2. Chipping a turpentine face with a round shave.
Source: North Carolina Collection, UNC Libraries.

The purpose of chipping was to keep the tree leaking into its box, and had therefore to be endlessly repeated lest the wound clot and resin cease to flow. To make the tree bleed, Frederick Law Olmsted wrote, “the bark, and a few of the outer rings of the wood of the tree, are cut off (‘hacked’) along the edge of the upper lip” of the box, and about mid-March, the resin began to flow from “this excoriation ... and gradually fills the boxes.”¹⁰¹ Producers expected each slave to move and labor carefully and precisely through the gridded pines with a long-handled sharp tool called a “hacker” or a “shave.” To begin chipping, a slave “stands nearly in front of the box, and

¹⁰⁰ Outland, *Tapping the Pines*, 67.

¹⁰¹ Olmsted, *A Journey in the Seaboard Slave States*, 341.

makes a stroke from the perpendicular line to the corner, toward the centre or line from the middle of the box, upward, cutting a furrow-like gash through bark and sap-wood, and about a fourth of an inch deep into the wood,” described one article. It was swift, skillful labor “mostly done with one stroke, when the man immediately changes hands or position, or makes a like stroke on the opposite side towards the centre.” Repeating this process, a slave “passes through his ‘patterns’ until he gets over his whole crop, which he may readily do in six to eight days; and, as soon as over, he returns to where he began, and goes over them again and again until his boxes are full. The filling is generally done with four to six ‘chippings,’ or four to six weeks.”¹⁰²

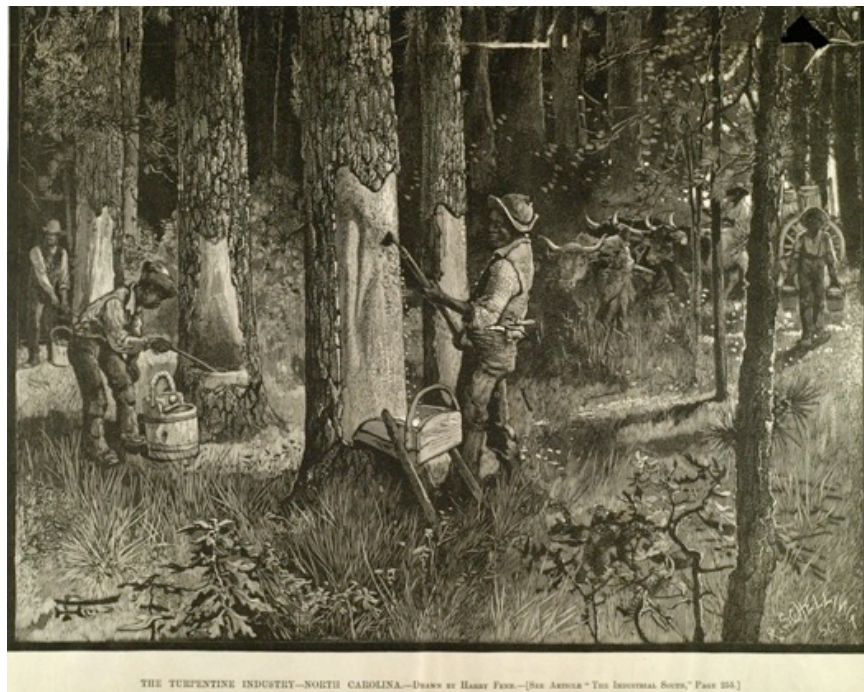


Figure 2.3. Dipping (and scraping) and hauling. Drawn by Harry Fenn, *Harper's Weekly*, April 9, 1887, 267.

From spring to autumn, an alternating pattern of chipping and dipping worked to steadily pump resin out of the trees and into barrels. So far I have focused mostly on the energy path connecting boxes to sunlight, made possible by boxing, and kept open by chipping. But as discussed above, this labor was all arranged to facilitate that of dipping, the crucial moment of

¹⁰² DeBow's Review, "Product of Turpentine at the South," 304.

expropriation in which slaves pulled resin out of a forest ecology and into an industrial one. As the weather warmed, the hundreds of thousands of chipped trees surrounding the Grist still would have begun to leak resin into the boxes, and either serially or in parallel it was soon “necessary to commence dipping, or the removal of the turpentine from the boxes to barrels.”¹⁰³ For the next several months, Benjamin Grist would press fifteen to twenty-five slaves to each dip a crop of several thousand pines.

Dipping involved taking “a spoon or ladle, of a peculiar form,” a tool “made of iron and steel, something like a trowel, with a wooden handle, the blade flat, six inches wide and nine or ten long, with a rounded point, thin at the edges,” and transferring the resin from boxes to specially made resin barrels.¹⁰⁴ Carrying this dipping “instrument in hand, and two rude pine buckets with bale or handle to them,” each slave would walk through his crop, guided by the staked out rows, checking each box to see if it were full, for “it is proper to remark that the boxes are all never full alike, some trees issuing much more and faster than others.” If full, the slave would set one of the buckets down next to the tree and begin “his dipping by thrusting his dipper in at one corner of the box, ranging it down to the bottom, and pressing it upward toward the opposite corner, all with a quick motion.” Having emptied the box of resin, the dipper “is immediately carried to the bucket... drawn over the near edge of the bucket to cleanse it from the adhering turpentine, and to accomplish this the more effectually, a strip of hoop-iron is fixed in the edge of the bucket to draw the dipper on.” One box down, “with quick step the next is reached, and so continued until the bucket is nearly full—it holding about eight gallons when full; the man carries it to the barrel and turns it in, and there leaves it to drain, while he is filling the

¹⁰³ Olmsted, *A Journey in the Seaboard Slave States*, 342.

¹⁰⁴ Olmsted, *A Journey in the Seaboard Slave States*, 340; “Turpentine. Hints for those about to Engage in its Manufacture,” *DeBow's Review*, October 19, 1855, 487.

other bucket, which is soon to take its place. Thus, a hand will fill from four to seven barrels a day.”¹⁰⁵ Though these descriptions suggested otherwise, dipping was dirty, unpleasant work. Writing nostalgically after the Civil War, *DeBow’s Review* lamented that it “is very difficult now to find any hands willing to execute this branch of the business. Their hands and clothing become smeared with the gum, and even two dollars per diem will not now induce a piny woodsman or freedman to dip much turpentine.”¹⁰⁶

One strategy to keep the channel open between sun, tree, box, and barrel was to divide the slaves into chippers and dippers. This was, at least some of the time, practiced by Grist operators. One letter from an overseer complained that while the previous week “all of the Boxes Chiped and no lost time with the dipers,” at present the “weather has been very hot and it has been Rather difficult to press the Chippers up to the work.” Indeed, it was so hot that many of the chippers grew faint, and “in fact some of them let down some A little sick.” Nevertheless, their rest would be short, as “all hands will got to work in the morning and I intend to press them from the start.”¹⁰⁷ In another letter, Benjamin Grist wrote to his cousin James that “the chipping + all is going on strate John soon will macke a first rate chiper.”¹⁰⁸

It is likely, however, that this division of labor was only temporary, for according to Olmsted the “other way—and this is more common—is to give each hand a task of trees, each of which he is required to both hack and dip stately. Twenty-five hundred trees give a man five days’ employment hacking, and one day dipping, in a week.”¹⁰⁹ This method meant that managers divided the labor of dipping and chipping in time instead of in bodies, and also tied

¹⁰⁵ DeBow’s Review, “Product of Turpentine at the South,” 303-4.

¹⁰⁶ “The Pine Forests of the South,” *DeBow’s Review*, February 3, 1867, 197.

¹⁰⁷ E P Patterson to James R. Grist, Prospect Hall, August 3, 1859, Box 3, CS May-October 1859, JRGBR.

¹⁰⁸ Benjamin Grist to James R. Grist, Gristville, April 12, 1853, Box 3, CS 1853-1854, JRGBR.

¹⁰⁹ Olmsted, *A Journey in the Seaboard Slave States*, 342.

individual slaves more tightly (and less collectively) to individual crops of pines. Most often, it seems, one slave would box, chip, and dip one section of the forest—a less efficient division of labor, but likely a far more effective division and measurement of laborers. At Grist Depot, a turpentine camp located not on a river, but near the South Carolina border along the Wilmington & Manchester Rail Road, M. Jones, the operator, always labeled crops by the name of the slave who boxed it, even for measuring dipping: “Dick crop dipt 48, Squear crop dipt 46, Jim Turdin crop 44,” and so on. Dick, however, had already been gone for at least a week, so it was likely one of the “ten handes dipping” who dipped Dick’s crop.¹¹⁰ When another slave, “Selvester,” had run away, M. Jones wrote that “i dipt his crop last week it dipt 57 barrels,” and that the other slaves “all got over last week but Selvester he is no better now then he was before he runaway. i dont beleave that he will ever chip over in the week unless it is whipt out of him.”¹¹¹ One week avoiding dipping, another spent slowly chipping, Selvester was sabotaging his engine of resin by wounding the trees too little and letting them run to waste. After yet another instance in which a slave had run away, Jones felt it necessary to indicate that “John clarke Dipt 52 but he did not make it,” suggesting that the name of the crop usually meant it was boxed, chipped, and dipped by that slave.¹¹²

In this way, the very work the slaves did (or did not do) in the forest became part of their surveillance. As overseers rode through the woods, they might not see or even hear the slaves, but they could read a history of work and movement in the landscape itself. The division of crops into rows were like lines on a page suggesting direction and location, while the trees—whether or not they were chipped or dipped—silently betrayed the slaves presence or absence. “Dear Sir,”

¹¹⁰ M. Jones to James R. Grist, October 30, 1855, Box 3, CS 1855-1856, JRGBR.

¹¹¹ M. Jones to James R. Grist, Grist Depot, July 11, 1858, Box 3, CS 1857-August 1858, JRGBR.

¹¹² M. Jones to James R. Grist, Grist Depot, July 4, 1858, Box 3, CS 1857-August 1858, JRGBR.

penned M. Jones hesitantly to his employer, “i would say to you that Miles clarke is runaway from the fact that he lackes about thirty five hundred boxes of chipping his crop over this weeke and i could not finde him Satredy in them + have not seen him yet.”¹¹³ Unpacking these lines reveals much about the geography of labor in the camps. First, Jones only believed Miles Clark had run away. He could not be sure and so he went looking for him in his crop. This meant that it was not unusual for overseers to not see or hear from their slaves for days at a time, and that slaves must have slept in their crops. The clearest evidence, moreover, was not even the fact that Jones could not find Miles; it was that about half of the trees in his crop had started to heal over their wounds. Betrayed by the trees, but not before slipping through the loosely woven net of boxes, quotas, tasks, and overseers, Miles Clark managed to stay out for at least a month, and none of the other slaves escaping and returning admitted to seeing him (they did mention others who had not returned). After that there is a gap in the record, but no mention is ever made of him again, suggesting one of four possibilities: he was eventually caught and sold; he escaped to the North; he remained living as a maroon in one of the region’s many swamps; or he died somewhere in the woods.

For a turpentine camp to function as an engine of accumulation, the solar energy captured and congealed in resin had to be kept moving at a coordinated pace between the four energy reservoirs of boxes, resin barrels, stills, and spirit barrels. Successfully building and maintaining these connections through widely variable and uneven terrain was never assured, and the particular spatial configurations of these webs meant that some links were more (or at least differently) vulnerable than others. In many ways, the most contested and most frequently broken segments of the web were those short threads spun at the periphery of the camps between

¹¹³ M. Jones to James R. Grist, Grist Depot, August 22, 1858, Box 3, CS 1857-August 1858, JRGBR.

boxes and barrels. This first step out of the pines might have been no longer than one hundred yards (50 barrels per 100 acre task), but it took place at the outer reaches of slaveholders' power. The resin was dipped out of boxes and carried in buckets by living, breathing, socially entangled slaves who had walked perhaps miles from the center of the camp, where food, shelter, clothing, water, and equipment—the means of human life and labor—were concentrated under the control of a white manager like Benjamin Grist.

By dividing the forest with stakes into a legible workscape, managers were able to force the slaves to box, hack, and dip an easily deciphered account of their labor and location into the trees themselves.¹¹⁴ But with usually no more than one or two overseers at each camp, the thousands of acres over which thirty or so slaves labored meant that even with the fastest horses, overseers were unable to even check up on every slave every day, let alone carefully monitor their work. A more effective labor tool was probably the task system itself, partly in the way it made the forest legible, but also by allowing slaves to “get over” or “gain Saturday” by exceeding quota and earn some money.¹¹⁵

The task system, however, was as much stick as carrot, as Selvester learned when he failed to get over. M. Jones wrote of Selvester that “he is no better now then he was before he runaway. i dont beleave that he will ever chip over in the week unless it is whipt out of him.”¹¹⁶ Keeping between the whip and the reward of Saturday was more than many slaves could handle. Whether feigned or not, illness was a consistent outcome of the physical and mental strain of the task system, and an obstacle impeding the circulation of laboring men and resin between boxes and barrels. A month after being whipped, “Selvester was sick last weeke + last two days + he

¹¹⁴ For more on the concept of the “workscape,” see Thomas Andrews, *Killing for Coal: America's Deadliest Labor War* (Cambridge: Harvard University Press, 2008).

¹¹⁵ Outland, *Tapping the Pines*, 82.

¹¹⁶ M. Jones to James R. Grist, Grist Depot, July 11, 1858, JRGBR.

falde to get over,” while another slave, “John grist is very sick he lackes about two thousand boxes of getting over last week. he give up friday morning.”¹¹⁷ Broken down, or simply fed up, slaves’ bodies were sites of continual struggle in the piney woods; masters sought to keep them laboring compliantly while slaves fought not only to stay alive, but to gain some measure of control over their lives.

A chief weapon in this struggle was the spatial arrangement of food in the camps. To control slaves, operators controlled the flow of caloric energy into and throughout the camps. Although some managers, like M. Jones, tried to produce supplemental corn for the workers and fodder for the mules in clearings at the camps, almost all of the food and fodder arrived in the camps through the narrowly controlled supply-lines running by steamship and railroad from the coast. The soggy ruined corn that Benjamin Grist received by steamboat demonstrated that these supply lines were far from perfect, but for the slaves, the major problem was what happened to the corn once it was unloaded. “I recd Eight hundred bushels of corn,” wrote one of the Grist operators and “sent 425 to Whitfield at the mill and have stored the ballanse at the store &c.”¹¹⁸ The slaves would often be used to concentrate all the food in locked storehouses, as at the Jones operation where “four hands helping Jim Ganer house corn” for a couple weeks.¹¹⁹ Unlike at plantations, where food was usually produced onsite, and which “afforded hungry slaves greater opportunity to raid smokehouses, chicken coops, orchards, dairies, gardens, and cornfields,” slaves at turpentine camps “found stealing food more difficult.” They did have the “advantage” of hunting, fishing, and foraging in woods and swamps that supported an abundance of wildlife and free-ranging hogs and cattle, but the demands of the work regime kept turpentine slaves’

¹¹⁷ M. Jones to James R. Grist, Grist Depot, August 29, 1858, JRGBR.

¹¹⁸ John T. Council to James R. Grist, April 21, 1857, Box 3, CS 1857-August 1858, JRGBR.

¹¹⁹ M. Jones to James R. Grist, October 24, 1855, Box 3, CS 1855-1856, JRGBR.

stomachs tied to the centers of the camps and dependent on the rations provided by white operators.¹²⁰ Sometimes, moreover, that ecological abundance could turn on the slaves. “A huge she bear was killed last week in the woods of Mr. William Foy of Jones county, by one of his turpentine hands, while chipping boxes,” reported one newspaper in 1855. Fish and squirrels were not the only things living in the woods; large predators like bears and alligators thrived as well. In this instance, a bear “had seized a hog and was in the act of dispatching it when the turpentine maker struck Bruin over the head with a round shave, and with some difficulty succeeded in killing her. This is said to be an act of daring unknown to old and experienced bear hunters.”¹²¹

Even when this arrangement worked smoothly, however, powering and sustaining slaves between boxes and barrels was a constant struggle against summer heat. The hot, dry summers drew the resin out of the trees, but it also leached precious water from the exhausted slaves. As one manager wrote desperately from South Carolina, “last weak it was sow warm out hear that the negros fainted down in the woods I had sevon down last weak but I have them all out at work this weak.” As slaves collapsed from heat, dehydration, and exhaustion, the overseer, himself tangled in social webs of debt and dependency, vowed to push them ahead despite the fact that “it is very sickly out hear at this time,” and he was “behind about a weak in Diping out the third time.” He knew that if he could only “get along without much more sickness and the weather not two bad I think I shall push 600 bbs Spirits done. I shall dow all in my power to make all I can for I am working for my self as well as for Grist + Davis for my work has to be my Recomendation in the State sow it is to my interest to make all I can.”¹²² During a remarkably

¹²⁰ Outland, *Tapping the Pines*, 89; de Boer, *Nature, Business, and Community*, 26-30.

¹²¹ “Bear Killed,” *Fayetteville Observer*, September 3, 1855.

¹²² R. M. Wadsworth to James R. Grist, Lynch Creek PO, August 11, 1854, Box 3, CS 1853-1854, JRGBR.

hot season at the newest Grist turpentine colony in Alabama, the rains failed, “the wells is dry” and Benjamin Grist had “to hall water in the woods to the hands.”¹²³ A week later and it was “still dry + hot + noe rane yeat I have to hall water in the woods to all of my hands I never saw such a time.”¹²⁴ For months, this extreme heat threatened to overwhelm the industrial circuits between boxes and barrels. As dehydrated slaves struggled to keep up with the resin flowing from the trees, Grist forced a different form of vital circulation through the woods as “it was necessary ‘to keep Dave hauling water with the carte all the time in the woods to the hands.’ ”¹²⁵

Finding fresh water was always a challenge in turpentine camps. Fresh, clear, flowing streams were rare in the woods, and slaves were wise to avoid drinking from the murky swamps that predominated in the Cape Fear region. During less extreme seasons, slaves actually found water in the boxes they had carved into the forest. According to the historian Robert Outland, many chippers and dippers “carried a hollow reed straw that they used to suck the water collected in turpentine boxes after rains.”¹²⁶ Yet as Outland is quick to point out, and despite contemporary claims to the contrary, this was almost definitely poisonous. Ingesting resin in even small amounts could be dangerous, and may have caused the diarrhea, or “flux,” that kept so many turpentine slaves too ill to work. Some slaves may even have drunk this water as a means (if an uncomfortable one) of getting out of work. It was hardly a real choice, however. The back breaking work of hacking and hauling dip in the hot summer woods usually meant slaves could either risk drinking the water pooled in the boxes or suffer the effects of severe dehydration.

¹²³ Benjamin Grist to James R. Grist, Fish River, May 29, 1860, Box 3, CS November 1859-June 1860, JRGBR.

¹²⁴ Benjamin Grist to James R. Grist, Fish River, June 7, 1860, CS November 1859-June 1860, JRGBR.

¹²⁵ Quoted from Outland, *Tapping the Pines*, 90.

¹²⁶ Outland, *Tapping the Pines*, 90.

Beaten down, starved, dehydrated, and miles and miles from loved ones, it was no surprise that slaves tried to escape their piney frontier prisons. Slaves seem overwhelmingly to have abandoned the camps during the dipping season, when both the labor process and summer heat combined to make leaving more attractive and more feasible than at any other time.¹²⁷ Masters and overseers knew this, and fought hard to capture, terrorize, or otherwise drive in slaves who had escaped the confines of the camps. Controlling food, violence, and “rewards” constituted white power over slaves in the political ecology of the camps, but in the forests and swamps surrounding these camps, masters had to rely on other weapons.

Fugitive Landscapes in the Interstices of Piney Light

Miles Clark may have labored alone, and he may have escaped alone, but as he left his coagulating crop of trees behind, he entered into a strangely social landscape that was as much a part of the geography of piney light as the rivers, stills, and boxes. His first concern would likely have been to get as far from camp as possible before nightfall. He would also need to find water, both for survival and to hide his trail from the dogs that might soon be following him. Stories and information circulated among the turpentine slaves of the Cape Fear River camps, and Miles would have heard that a year before, a group of runaway slaves a few miles north had been hounded and terrorized by dogs. John T. Council, one of the managers of those runaway slaves, had written, “I have had Bryan with his dogs hunting my boys, which no doubt has bin the cause of running one them home + I think will send the other in and Benjamin will have men out after yours, in a few days.”¹²⁸ Yet it was because of just such stories that Miles Clark was likely heading in precisely that direction. These are stories, however, lost to historians. There are no known

¹²⁷ Of a sample of 77 letters from the JRGBR written from North Carolina between 1850-1860, there are 61 separate mentions of runaway turpentine slaves. Only 4 fell outside the April-October dipping season.

¹²⁸ John T. Council to James R. Grist, April 21, 1857, JRGBR.

slave narratives of life in the turpentine camps, isolated outposts of slavery that may have been porous, but from which slaves escaped North only with tremendous difficulty.

Turpentine slaves led an often solitary existence, but they almost never arrived at the camps alone. Miles Clark was sold to the Grist with at least eight other slaves from the Clark plantation, including Ben Clark, Jack Clark, and Tom Clark.¹²⁹ They were put to work at Grist Depot on the Wilmington & Manchester Rail Road under the management of M. Jones, about forty miles south of Benjamin Grist's camp. Sometime in April, as chipping and dipping got into full swing, Ben, Jack, and Tom escaped North with three other slaves named Selvestor, Griffin, and Anson. Whether they escaped all at once or one at a time, by May they had formed a camp of their own in Goodman Swamp, close to the northern turpentine operations. This may have been the same camp that John T. Council had tried to disperse the year before with his dogs. Then, too, the camp had drawn slaves from several operations: "Whitfield has 5 negros in the woods 3 of yours and 2 of mine. but one of my boys has come in this moment which leaves four out, viz. Sandy[,] Bill Howard[,] and Osko, + one of mine. all left with out a cause, or only to git clear of work. we have maid every inquiry for Sandy and hear nothing of him. I fear we weill be troubled to get those boys."¹³⁰

John T. Council faced even greater troubles the year that the Clark men escaped. Three months before Miles Clark ran away, Ben and Jack Clark narrowly thwarted Council's attempts to re-enslave them. "Mr Stone my overseeor found Ben + Jack Clark and caught Ben," Council wrote. Tying Ben to a tree, the overseer tried to follow Jack, but soon lost him. Returning to where he had tied up Ben he found that "in making an effort to catch Jack Ben got away which I

¹²⁹ M. Jones, "Account Book." The nine Clark slaves listed in Jones' account book were: Miles Clark, Tom Clark, Prince Clark, John Clark, Ben Clark, Moses Clark, Clem Clark, Prive Clark, and Jack Clark.

¹³⁰ John T. Council to James R. Grist, April 21, 1857, JRGBR.

very much regret.” Still, Council, relying on the information circulated through networks of dogs, masters, overseers, and captured slaves, felt there was “but little doubt but they are in the neighbourhood. Thos. J. Purdie sent word to Stone that your boys had a camp in Goodmand Swamp below John Monrain. he had caught Lyon’s Boy who had been runaway and he said he had been with them in their camp.” Now that he knew their general location, Council was optimistic that “we will be able to get them altho we maid a bad start to let Ben get off, but we will give the matter the strictest attention &c.”¹³¹ Though all the managers and overseers in the area undoubtedly tried, it seems that they met with only partial success.

Many North Carolina slaves were excellent fishermen and woodsmen, with embodied knowledge learned and preserved through generations of slavery and exchange with tidewater Indians and Afro-Caribbean watermen.¹³² This meant slaves could, at least for a time, survive without access to camp foodstuffs by hunting, fishing, and foraging, and many did.¹³³ Some even moved in the opposite direction, as the quota and incentive system with which camp overseers attempted to manage turpentine slaves also “proved a great inducement for slave woodsmen to earn money or free time by subcontracting with fugitives.”¹³⁴ In the swampy interstices running between languid rivers and pine savannas, North Carolina runaways made a durable constellation of maroon spaces. Turpentine workers continually moved in and out of these alternative geographies, helping to preserve them by exchanging goods, information, and safety as they crossed and recrossed the piney boundaries of slavery and freedom in the camps. In the Green Swamp, near Grist Depot, and somewhat south of Goodman Swamp, runaways had built

¹³¹ John T. Council to Allen & James R. Grist, May 7, 1858, Box 3, CS 1857-August 1858, JRGBR.

¹³² Cecelski, *The Waterman’s Song*, 4-56.

¹³³ Outland, *Tapping the Pines*, 89.

¹³⁴ Cecelski, *The Waterman’s Song*, 131-32.

“at least eleven cabins and carved out a garden and grazing area in the midst of the swamp.” In 1856, this fugitive camp resisted an attempted raid so successfully that in the aftermath, “local whites were unable to recruit slave hunters willing to make another foray into the swamp.”¹³⁵ Some of the escaped slaves may even have encountered the radical networks of enslaved watermen piloting vessels between Fayetteville and Wilmington, that maritime “‘asylum for Runaways.’”¹³⁶ In the summer of 1858, these political and ecological strategies seemed to have worked, as most of the slaves remained free.

Selvester, however, seemed to have been driven back to Grist Depot, although it is possible he returned on his own or with plans to gather more runaways. “Selvester cum in tusday morning he ses that he has not seen griffin & anson but [once] sence tha went to [Goodman Swamp],” wrote M. Jones on the fourth of July.¹³⁷ And he was not back in camp to work happily. A week later Jones wrote that all of the slaves except Selvester had “got over” and that “he is no better now then he was before he runaway.” Jones felt that only whipping would improve his productivity.¹³⁸ Some time after Selvester returned, Lewis Latham and Clem Clark, while out dipping and chipping, escaped up to the Goodman Swamp camp.¹³⁹ Miles Clark followed soon after, and when Lewis and Clem returned on the first of September, Ruffin ran away only a few days later.¹⁴⁰ As some slaves returned, others ran away, and it is difficult to see this as anything other than evidence of considerable coordination, and of well established and well protected escape routes and hiding spots kept and accumulated over more than a decade by thousands of

¹³⁵ Cecelski, *The Waterman's Song*, 128-29; de Boer, *Nature, Business, and Community*, 67-68.

¹³⁶ Cecelski, *The Waterman's Song*, 124.

¹³⁷ M. Jones to James R. Grist, Grist Depot, July 4, 1858, JRGBR.

¹³⁸ M. Jones to James R. Grist, Grist Depot, July 11, 1858, JRGBR.

¹³⁹ M. Jones to James R. Grist, Grist Depot, September 20, 1858, Box 3, CS September 1858-April 1859, JRGBR.

¹⁴⁰ M. Jones to James R. Grist, Grist Depot, September 12, 1858, Box 3, CS September 1858-April 1859, JRGBR.

turpentine slaves. These were political strategies developed by slaves to invert the carceral landscape of trees, distance, swamps, and hunger into a temporary geography of freedom.¹⁴¹

The managers were certainly convinced of conspiracy and the power that this hidden geography of freedom had to grind turpentine production to a halt. “I cant push as i would like to for the handes will not beare it,” M. Jones wrote in utter frustration, “so i have to doo the best i can to ceep them hear. the dam clarke negros has nearley ruend yours.”¹⁴² The summer of 1858 seemed to tip the balance of power to an unusual degree in the slaves’ favor. Perhaps this was because Benjamin Grist had departed North Carolina for Alabama with slaves, overseers, and the primary focus of James R. and Allen Grist, who shifted their attention west to those highly productive virgin pines. Jones and the other managers remaining in North Carolina, however, attributed it more to a specific coordinated conspiracy directed by the Clark slaves.

This continued until at least November, with some slaves moving back and forth between the swamp camp and the turpentine camps, and others remaining continually on the run. John T. Council, who months earlier seemed so optimistic that he and his overseer would catch all the slaves, admitted, “I have had one out for three months and cannot hear from him. but my opinion is that they are in the neighbourhood,” and pointedly suggested that he “would be glad you would send dogs and make some active steps to catch them in which I will give all the assistance I can.”¹⁴³ A few weeks later and no apparent action (or at least no apparent success) and Council wrote again to strongly advise “you moove your negros which you intend to moove to Ala before you close your years buisness in Columbus, and the quicker you do it the better,”

¹⁴¹ For discussion of carceral landscapes, incarceration, and excarceration, see Johnson, “The Carceral Landscape” in *River of Dark Dreams*, 209-243; Peter Linebaugh, “Jack Sheppard and the Art of Escape,” in *The London Hanged: Crime and Civil Society in the Eighteenth Century*, 2nd ed. (London: Verso, 2003), 7-41.

¹⁴² M. Jones to James R. Grist, Grist Depot, September 12, 1858, JRGBR.

¹⁴³ John T. Council to James R. Grist, October 13, 1858, Box 3, CS September 1858-April 1859, JRGBR.

for, he emphasized with underline, “I have had a hint from one of my negroes. That is a noughf for you to know. be on your lookout.”¹⁴⁴

However, the 1858 acts of defiance and flight were more than just products of the internal workings and logic of the camps. Only a few months before the Clark men deserted Grist Depot, Benjamin Grist had ordered his slaves to dismantle the Gristville camp he had begun 8 years before. The reason was that it was no longer functioning as a productive engine of either turpentine or enslavement; the chipped faces too high, the long-injured trees sickened and sluggish, and the slaves grown too skilled at escaping and staying out.¹⁴⁵ But as he abandoned his Gristville camp, Benjamin Grist was far from done with turpentine. And the same was true for the slaves under his command. James Grist had ordered Benjamin, along with most of the Gristville slaves, hundreds of miles south to Alabama.¹⁴⁶ When the Clarks ran away in North Carolina, they made sure they escaped the journey to Alabama, where more productive pines and unfamiliar terrain meant more brutal work and a tighter carceral landscape. Their very success at staying in place, however, may have convinced James Grist to dislocate others. By the start of the next season, with Benjamin Grist requesting nearly 90 hands, James decided to ship many of his rebellious slaves to Alabama, displacing a spatial politics that was slipping out of his control by expanding his turpentine empire into new lands.¹⁴⁷

It seemed that winter ended the 1858 confrontation, narrowing the possibilities of finding food and water in the terrain between the storehouses, while Christmas drew slaves back to the

¹⁴⁴ John T. Council to James R. Grist, Prospect Hall P.O., October 25, 1858, Box 3, CS September 1858-April 1859, JRGBR.

¹⁴⁵ Benjamin Grist to James R. Grist, Gristville, July 5, 1857, Box 3, CS 1857-August 1858, JRGBR.

¹⁴⁶ Benjamin Grist to James R. Grist, Danley Mills (AL), April 6, 1858, Box 3, CS 1857-August 1858, JRGBR.

¹⁴⁷ Benjamin Grist to James R. Grist, Dannelley Mill, February 27, 1859, Box 3, CS September 1858-April 1859, JRGBR.

plantations to see their families. The written record falls off before the conflict was resolved, but by 1860, all the Clark men except Miles were back at work at Grist Depot with Selvestor, Griffin, Lewis, and Clem. M. Jones makes no mention of any more runaways after 1858, and it is not clear what changed. Whatever the case, slaves no longer appeared able or willing to sustain a geography of freedom against their exploitation in the turpentine camps. Perhaps dogs were finally sent, rewards posted, and captured slaves forced to reveal their secrets, but the most powerful threat was probably that of sale or transportation into the expanding southwestern frontier of turpentine.

Producing resin was backbreaking, dangerous work, but for all its exhausting isolation, it usually kept North Carolinian slaves at least nominally close to their communities. To be a slave, however, was not only to be oppressed, it was to be property. And property could be sold and dislocated at any time. After one slave, Ned, ran all the way back home to his wife in Virginia, the wife's owner, recognizing that turpentine work was not sufficiently dislocating to discipline Ned, asked that if James R. Grist would not sell Ned to him, "not to put him to getting turpentine again, he will run or cause you more trouble than profit, but to sell him at once. He ought to suit the market for Sugar planters, and New Orleans should be his place of sale."¹⁴⁸ Of course, the expansion of the turpentine industry into the Deep South was another, and even more effective, mechanism for using the slave market to discipline and dislocate slaves. "I have a Negro man in jail, which I wish you would take out to Mobile, or Florida," read a letter to James R. Grist. Worried that his slave might runaway, the owner was happy to translate disobedience into profit, suggesting that "you can pay me what you are paying for other like negroes. He is a carpenter,

¹⁴⁸ William T. Parham to Mr. James Grice, Jarratts, Sussex Co. Va, May 1, 1854, Box 3, CS 1853-1854, JRGBR.

but has been giving me trouble about going to see his Wife.”¹⁴⁹ This was common practice. In one letter to his father James was delighted that Benjamin Grist “sold the boy Nelson that was runaway in Robeson for \$1150, exactly the first cost.”¹⁵⁰ In the antebellum piney woods, the deceptively simple act of pulling resin from a tree to a barrel produced an extraordinarily political space. As overseers and owners spun dogs, ledgers, whips, privation, provision, trees, and markets into entangling webs of surveillance, violence, hunger, and dislocation, slaves struggled carefully and skillfully to turn the labor process to their advantage—to redirect a knowledge of the landscape and longleaf biology learned through years of work and pain into a marginally more free existence.

Racing to the Still

Dipping was the beginning of the resin’s journey from box to still, but it only got it part of the way. Boxes at one end, barrels at the other, the story of dipping, then, was also the story of coopering. Made at the cooper shop near the still, these barrels would be hauled out and placed throughout the forest, “thirty-five or forty to the task, at convenient distances, all ready to receive the turpentine.”¹⁵¹ Coopers were essential spatial laborers in the camps. While the boxers and chippers let dippers reach through the trees and scoop out sunlight, the coopers provided the vessels enveloping that fleeting, evaporating energy on its passage to the still. For this they made a crude kind of barrel from wood collected at the camps (the best barrels were made later to store the extremely volatile and leaky distilled spirits of turpentine). So important were coopers that in

¹⁴⁹ Henry S. Clark to James R. Grist, Greenville N.C., March 26, 1860, Box 3, CS November 1859-June 1860, JRGBR.

¹⁵⁰ James R. Grist to Allen Grist, Wilmington, October 22, 1854, Box 3, CS 1853-1854, JRGBR.

¹⁵¹ DeBow’s Review, “Turpentine. Hints for those about to Engage in its Manufacture,” 487.

“a gang of hands getting turpentine every fifth man may be a cooper, and will be employed the year through in providing his own materials and keeping the others supplied with barrels.”¹⁵²

The work of gathering these materials could send coopers and their assistants far from oversight, as Benjamin Grist realized when he wrote his cousin to “please let Hollon goe up the river + see what tham hoops hands is doing + rite me.” These “hoops hands” were slaves that had gone to gather and make hoops for the barrels, and Grist had “told Jake [a slave cooper] to cut last week 7000 poles more + that wood make a nuff + if he dide it will tacke all of nex week to finish drawing tham”¹⁵³ The barrels Frederick Law Olmsted witnessed were made of “staves split from pine-logs, shaved and trimmed. They are hooped with split oak-saplings.” Olmsted observed further that a skilled cooper was expected to make six or seven barrels “of the rudest construction possible” in a day.¹⁵⁴ Without these precious barrels, there could be no dipping, as M. Jones experienced when the barrels he was expecting to be shipped from Wilmington failed to arrive. “You stated in your last letter that you would send me five hundred Rosin barrels,” Jones wrote to James R. Grist, but “i have not receve them i am needing them very bad for i have not got barrels to carrey on my work. i wanted to finish Dipping back boxes this week but if i dont get barrels i cante doo it.”¹⁵⁵

The most fiercely contested terrain in the accumulation of piney light may have centered around forging and pumping a fluid stream of energy from boxes to barrels, but the labor of circulating those barrels between the pine crops and the stills was equally important, and was dragged into motion over its own shifting battleground. Dipping concentrated the products of

¹⁵² DeBow’s Review, “Turpentine. Hints for those about to Engage in its Manufacture,” 488.

¹⁵³ Benjamin Grist to James R. Grist, Gristville, April 12, 1853, JRGBR.

¹⁵⁴ Olmsted, *A Journey in the Seaboard Slave States*, 340.

¹⁵⁵ M. Jones to James R. Grist, Grist Depot, July 26, 1857, Box 3, CS 1857-August 1858, JRGBR.

tens of thousands of boxes into hundreds of barrels scattered over several square miles. It was not, however, only distance that had to be traversed, but time as well. From the moment resin flowed out of the trees, the precious spirits that were to be distilled into turpentine began to evaporate. The hotter the weather, the faster the evaporation, but even in cooler weather spirits were lost if left to sit in boxes or barrels for too long.¹⁵⁶ While slaves carried streams of buckets to and from the boxes and barrels, another smaller group of laborers circulated through the forest creating an intersecting stream of barrels.

The operator tasked one strong laborer (sometimes but not always a slave) to move through the crops, leading a team of mules yoked to a hauling cart, until he found a full barrel, where he was to plug the top and roll the nearly three-hundred pound vessel onto a dray. This difficult process would be repeated over the day, each team of mules and man expected to “haul the turpentine dipped by ten hands an average distance of three miles, with spare time for hauling provisions, empty barrels, &c.” These haulers formed the circulatory systems of the turpentine camps, providing the material means of both organic and industrial life and labor. They ferried food and empty barrels out to the laborers and carried recharged resin vessels back to the stills. In winter, when the dipping season was over, these teams were relied on to both reset the piney channels and secure their own caloric means of movement by “hauling barrels, staves, ploughing in oats, or preparing ground for early peas and potatoes, so as to provide a large part of their own forage for himself and team.”¹⁵⁷

This was essential space-making labor, and managers were willing to pay for it. In his first spring at St. Pauls, Benjamin Grist wrote his cousin that he had to “pay Alf Jackson \$50 for

¹⁵⁶ Outland, *Tapping the Pines*, 72.

¹⁵⁷ DeBow’s Review, “Turpentine. Hints for those about to Engage in its Manufacture,” 487.

waggen + C. B. Tyson \$30 for haling done last winter.”¹⁵⁸ Other managers, who used slaves to haul, feared sabotage, one writing in his *Treatise on Turpentine Farming* that “I have thought sometimes that they hunted for logs, so that they might drive the cart over them, and indeed, take every possible advantage, even to neglecting to water and feed the animals, fix the yoke, etc.”¹⁵⁹ While this kind of constipated movement could back up the flow of resin to the stills, hauling too much at the wrong times could be just as devastating.

Hauling depended on dipping at one end and access to a still at the other. The Grist operations always had stills on site, but this was not true for many of the smaller producers, who could find hauling a desperate misadventure. Absalom Davis, one such small producer, discovered for himself how lacking control over even a part of the geography of turpentine production could render one powerless. Slaves felt this most acutely, but even owners were vulnerable. Davis had gotten into the turpentine business at the suggestion of Benjamin Grist with the understanding that he would sell the resin he dipped to the Grist still near St. Pauls. After a successful year, and further prompting from Benjamin Grist, Davis hired an overseer, “bought more land, doubled my boxes, &c &c, but much to my suprise, soon learned that you could not take my Turpentine at the Robeson still.” He was angry, but “was informed at the same time that it would be taken at the River still at 25 cents below the Wilmington price. So I purch'd a waggon, saw, &c and went to work determined to go ahead.” Hauling 150 barrels of weeks-old dip all the way to the river, Davis did manage to sell his resin at the lower price, but when he returned the following week with 100 barrels of “virgin dip” the river distillery refused to take it “and it has stood on the Bank of the River some 2 months, and I suppose is nearly lost.” Other stills in other towns were “buying freely” but it was “of no avail to us. We cannot reach

¹⁵⁸ Benjamin Grist to James R. Grist, Gristville, May 19, 1852, Box 2, CS 1845-1852, JRGBR.

¹⁵⁹ G. W. Perry, *Treatise on Turpentine Farming* (New Bern, NC: Muse & Davies, 1859), 119.

them.” Stranded with hundreds of barrels of piney energy he could not sell or save, Davis felt betrayed, and had he “known how this was to be, my last boxes would not have been cut; for my experiment of this task in this neighborhood has failed, for want of a River or a Still. And had I not been assured in the outset that you would take my Turpentine this year ... we would have put up a still at all hazard But now it is too late, and we are doomed to a ruinous loss.”¹⁶⁰

Absalom Davis discovered how hauling with nowhere to go was like trying to deliver milk in cheese-cloth. It didn’t matter how hard he and his slaves had worked to get that resin into barrels. If it could not reach a still in time, those leaky barrels would leave him with only a small, useless mess. Even with secure access to a still, however, hauling remained a vulnerable space into which turpentine might yet disappear. “I can only say I am sorry I paid you Whitfields hiar or at least my portion of it,” wrote John T. Council in outrage, “for I now have evidence of a grate deal of Tirpintine that he Took from us.” At the end of a long career working for various Grist operations, it seemed W. G. Whitfield had decided to take what was due to him. And he knew how to hijack the geography of piney light. Council had just learned to his dismay that Whitfield had sold “a grate quanty” of resin to competing buyers by secretly hauling “Tirpintine in the night with my Teems to Robeson Landing and took my flat and floted it down the river and put it on [a steamboat] and sent it to Wilmington. I have bin informed this by William Young who carried the [steamboat] down.” Stealing resin away from one still to another could be hugely profitable, and apparently not even that difficult, as “it would surprise you to Know the amt of Terpintine he took in that way and it is more surprising that I had not caught him at it but every body appears to know it.”¹⁶¹

¹⁶⁰ Absalom Davis to Allen Grist, July 28, 1851, Box 2, CS 1845-1852, JRGBR.

¹⁶¹ John T. Council to James R. Grist, August 9, 1859, Box 3, CS May-October 1859, JRGBR.

It was rain, however, that posed the greatest threat, the most insurmountable obstacle to circulating barrels between crops and stills. When rains poured into the forests, raising rivers and making turpentine run, it also could turn the ground to a boggy mess. Not only did this make hauling more difficult, it could actually injure the trees, for “hauling heavy loads through the forest in wet weather ... skins up the roots, and breaks loose their hold, in consequence of the land’s being wet and soft, thus causing them to give way.” Turpentine producers were therefore cautioned that hauling “in wet weather should be carefully attended to, and cart-paths made in the thinnest part of the forest.”¹⁶² While carefully timing and placing the hauling of resin might have been crucial to the long-term health of these piney engines, by turning the ground to mud, heavy rains presented even more pressing short-term problems. As Benjamin Grist was to discover in Alabama, the rains that were so critical to opening river transportation between frontier camps and market cores could cut both ways. Heavy rain could effectively island crops and stills, as dipping and stilling remained feasible, but bridging the two grew all but impossible.

The year before a heat wave compelled Benjamin Grist to have water hauled out to the slaves, a deluge of rain threatened to break the camp in two. “I have got all my Hackers going + dipers + stills,” he wrote, “but the licke of raine I never saw in my life.” Boxes were linked with resin barrels and stills with spirit casks, but a rift had opened up between these two metabolic poles as mules and carts failed in the mud. With the rain coursing through the land, “it is all I can doe to git Empey barrels in the woods,” and although his slaves had dipped 125 barrels ahead of schedule, they could not haul it, and not only had they “lost 7 holes days by raine since chrismass,” but “my Bridge has bin wash a way three times this yare.”¹⁶³ A week later and with no improvement, Benjamin Grist was determined to reestablish the link between crops and stills,

¹⁶² G. W. Perry, *Treatise on Turpentine Farming*, 110.

¹⁶³ Benjamin Grist to James R. Grist, Fish River, March 20, 1859, Box 3, CS September 1858-April 1859, JRGBR.

and so he set “10 hands all the week [to] mack-ing roads to try + hall turpentin.” Clearing brush, laying planks, and reconnecting these productive spaces was crucial, for “the negros all worck well all git over thar crops,” and if only “it wood quit raning ... I cod hall.”¹⁶⁴ Try as he might, however, the torrential rains continued to fall “like never was known before ... which over flowed every thing, even to the bridge here at the house is all gone, & now it is impossible to do any halling out of the woods.”¹⁶⁵

Distilling Piney Light

In April of 1852, as Benjamin Grist prepared his new camp to be ready when the pines began to run, a slave mechanic named Castor was setting up the still. Once Castor had finished preparing the two-story structure, at least two other slaves, Jack and Willis, would have begun expertly weaving furnace fires and cooling creeks around a copper still, thereby channeling resin taken from the trees into pure spirits of turpentine and rosin.¹⁶⁶

Turpentine distilleries were the digestive centers of the social ecology of piney light, where natural energy was transformed into socially useable forms. Contemporaries, however, devoted little attention it, content merely to indicate its similarity to the distillation of whiskey. Frederick Law Olmsted, a writer from the North, was a rare exception. These stills, which ranged in capacity from five to twenty barrels, he wrote, “are usually placed in a ravine or valley, where water can be brought to them in troughs, so as to flow, at an elevation of fifteen feet from the ground, into the condensing tank.” Placed on the high ground of a sloping bank, “the still is set in a brick furnace. A floor or scaffold is erected on a level with the bottom of the still-head, and a

¹⁶⁴ Benjamin Grist to James R. Grist, Dannelley Mill, April 3, 1859, Box 3, CS September 1858-April 1859, JRGBR.

¹⁶⁵ Allen Grist Jr. to James R. Grist, Fish River, April 27, 1859, Box 3, CS September 1858-April 1859, JRGBR.

¹⁶⁶ Benjamin Grist to James R. Grist, Gristville, April 22, 1852, JRGBR; James R. Grist to Allen Grist, “At Ben’s,” September 17, 1852, Box 2, CS 1845-1852, JRGBR.

roof covers all.” When the resin that the pines had made and slaves had diverted into boxes, dipped into barrels, and hauled for miles finally reached the low-lying stills, the “still-head is taken off, and barrels of turpentine, full of rubbish as it is collected by the negroes, are emptied in. When the still is full, or nearly so, the still-head is put on, and the joint made tight with clay; fire is made, and soon a small, transparent stream of spirits begins to flow from the mouth of the worm, and is caught directly in the barrel in which it finally comes to market.”¹⁶⁷



Figure 2.4. “A North Carolina Turpentine Distillery,” in *Harper's Weekly*, April 1, 1876, 265.

The process of separating out the spirits would go on for around two hours, slaves like Jack and Willis carefully regulating the heat, tasting the liquid from the worm for water content, and in general trying to prevent either rapid cooling or overheating from causing the distillery to violently explode. When the stream running from the worm began to dry up, and “all the spirits, which can be profitably extracted, are thus drawn off, the fire is raked out of the furnace, a spigot is drawn from a spout at the bottom of the still, and the residuum flows out—a dark, thick fluid,

¹⁶⁷ Olmsted, *A Journey in the Seaboard Slave States*, 344-45.

appearing, as it runs, like molasses.” This was the rosin. For every barrel of spirits, the source of camphene, distilling would produce about five barrels of rosin, the source of rosin oil and gas.¹⁶⁸

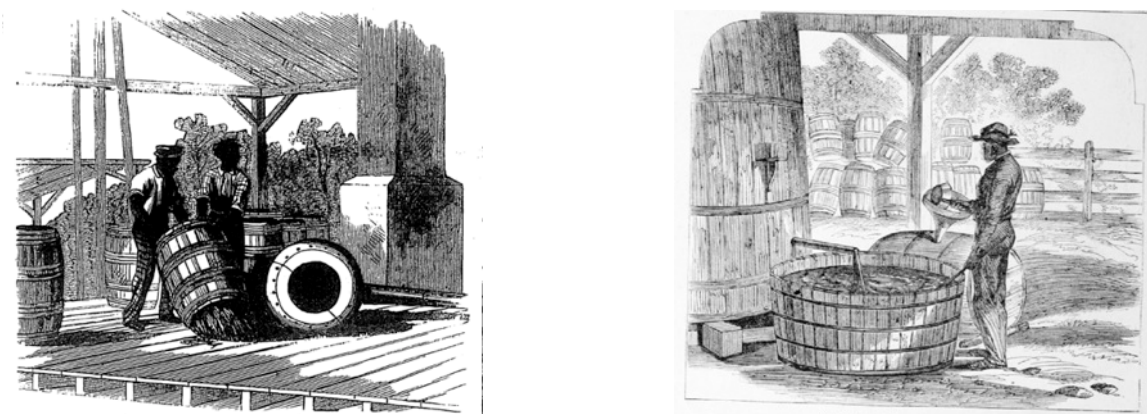


Figure 2.5. “Charging the Still,” and “Spirit Tub—Filling the Barrels,” in “Turpentine Manufacture in the Southern States.—From Sketches by Jas. E. Taylor,” *Frank Leslie's Illustrated Newspaper*, September 29, 1866, 24.

Stills separated and concentrated the organic products of longleaf pines into industrially consumable forms, but they did so only by consuming considerable flows of heat. Providing that heat was a major task for slaves. At the Grist stills, all the fuel for powering the fires came from locally cut wood, and overseers wove this labor throughout the year around the primary and time-sensitive tasks of boxing, chipping, and dipping. In November of 1855, M. Jones wrote that while he had fifteen slaves dipping and scraping resin, six were “getting timber,” one was cutting wood, and five were at the still.¹⁶⁹ In 1858, Jones paid seventeen different slaves a total of \$30.30 for cutting 50 ½ cords of still wood (sixty cents per cord).¹⁷⁰ This was a lot of wood. One cord was a stack of cut wood measuring four feet wide, eight feet long, and four feet high. Fifty cords, then, was enough chopped firewood to cover nearly two hundred square yards stacked four feet high. Distilling depended on more than heat and stills, however. It also required specially made spirit barrels to collect the thin clear liquid pouring from the worm.

¹⁶⁸ Olmsted, *A Journey in the Seaboard Slave States*, 344-45; Outland, *Tapping the Pines*, 75-77.

¹⁶⁹ M. Jones to James R. Grist, November 5, 1855, Box 3, CS 1855-1856, JRGBR.

¹⁷⁰ M. Jones, “Account Book.”

The circulation of spirit barrels between camps and markets was critical to the sustained accumulation of light. Given the power concentrated in the hands of shippers by the difficult terrain, controlling the production of these barrels was fiercely contested. Most managers attempted to avoid uneven negotiations with merchants by having slaves manufacture as many of these barrels as possible in the camps. One writer in *DeBow's Review* observed that the "distiller incurs great expense in the single article of spirit barrels. These must be iron bound, made in the best manner of seasoned white oak, and well coated within with glue, to prevent evaporation. They should contain from forty to forty-five gallons, and when ready for use cost little short of \$2 a piece." This was a considerable price, and it added up fast, "as there must be one spirit barrel provided to every seven of soft turpentine [resin], the demand for these barrels will of itself open an extensive new branch of business," and so the writer recommended strongly to "[l]et these, by all means, be made at home."¹⁷¹

"I think Ben has spirit bls to keep the business going on," wrote James R. Grist of the specialized barrels used to store the spirits of turpentine distilled from the raw product. Making turpentine into urban light required that these precious spirit barrels be circulated continually between turpentine camps, Southern ports, and Atlantic cities. James had sent "several hundred Empty Spirit Casks on the way up the river," these vessels of light keeping the spatial relations of production possible. Before finishing writing the letter, James happily added that "I have just received a letter from B. Grist; he says that he has received the Empty Spirit Casks + that the river was rising. I have great hope to get all of the produce down."¹⁷²

As the rivers rose with the spring and summer rains, islanded turpentine camps became temporarily accessible to the coasts, and producers and shippers struggled to move their traffic

¹⁷¹ DeBow's Review, "Turpentine. Hints for those about to Engage in its Manufacture," 489.

¹⁷² James R. Grist to Allen Grist, Wilmington, July 6, 1852, Box 2, CS 1845-1852, JRGBR.

before the flowing routes dried up. These were not static roads that people could arbitrarily open and close. The powerful currents that shippers navigated to push barrels, corn, and life to the camps could just as easily wrench them away. It was a Sunday night in September, two months after Benjamin Grist had received his spirit barrels when the river rose suddenly. In the early morning light, Jack and Willis prepared their work of transforming resin into spirits and rosin at the two-story still, located where a creek (whose waters cooled the condensing spirits) emptied into the Cape Fear River (whose waters Grist used to ship the spirits to Wilmington). Yet that Monday morning the sun dawned on a river threatening to steal months worth of light and labor congealed in barrels. “Jack found the river had rose so high that it was taking off some of our spirits casks that was beneath our Platform on the River Bank,” wrote James R. Grist to his father. As the only two “hands that was at the still early monday morning,” Jack and Willis sprang into action to save the casks. Grabbing a shallow-draft pole boat the two men bravely hopped in, but according to James, “Mr Skiles [the overseer] orderd Willis not to go but headstrong like would do so.” The current quickly overwhelmed the boat, flipped it over, and “Jack come near drowning + Willis not being able to swim was drowned.”

It was a terrible tragedy, but James R. Grist was mostly interested in making sure that he was not liable for Willis, a hired slave. “No person sent him + he was ordered by Mr Skiles not to go,” he wrote defensively, and “it was done without the knowled or consent of Ben.” James even tried to suggest that this was some kind of suicide, for “if the negroes will go + on there [own] accord + drown themselves it cannot be avoied + besides no good on earth could be done in takeing up spirit cask in a small Batow [bateau (a small river craft)] rushing down the stream + Jack was a great fool to have undertook it.” Piney light killed Willis Parmerly every bit as much as Mary Clark, but his death was translated and entangled in a very different politics of blame. And so James R. Grist contended, that although he was sorry for the loss, “you see at once we have

not worked or employed Willis by water + on the contrary he was orderd not to go by Mr Skiles our agent, therefore Mr Parmerly cannot expect us to pay for him.” Besides, what James R. Grist really cared about was transforming life and labor into turpentine he could ship to Wilmington, and that seemed to be going just fine. As he “rode over a portion of the boxes yesterday” James found the trees “well faced + well chiped. I see nothing going on rong in the business.” Slaves might drown, and some spirits might be lost, but for James it was no more than collateral damage so long as the turpentine kept flowing, concluding, “I really think there will be at least 8000 bls of Turpentine to get off + dip [and] the team looks very well indeed.”¹⁷³

Jack and Willis risked their lives for spirit barrels, for those vessels of light, when they rushed into the river. Perhaps James R. Grist was telling the truth when he claimed his overseer had ordered Jack and Willis not to try and rescue the casks, but the importance attached to these barrels was so strenuously articulated in the camps that the warning was likely met with skepticism. Without coopers and the barrels they continually produced, the whole geography of labor would unravel. To combat this threat, managers readily deployed violence in an attempt to discipline coopers. Jack and Willis had almost certainly seen this done. “Fred is runaway,” wrote one of Benjamin Grist’s overseers after such an incident, and “i have not seen him since Monday morning.” When the overseer discovered that morning that the cooper “Fred had not done any thing + old Jake had just got afire under the glue kettle i give both a lite whipping.” Yet by running away and slowing down work, Fred and Jake showed the power (if limited) that coopers wielded in turpentine landscapes. For although the boxes were dipping “from 69 to 89 bls the

¹⁷³ James R. Grist to Allen Grist, “At Ben’s,” September 17, 1852, JRGBR.

way the cooppers is going on the business must stop.” With Fred runaway, Grist had only “3 cooppers under the shop [and] the stils is behind on account of not having spirit bls in time.”¹⁷⁴

Reproducing Camps

Turpentine camps were living ecologies that planters forced into being and coerced into survival, but as they were living, they could grow old and die. They could also be reproduced. An ecological complex that began in North Carolina, turpentine camps spread rapidly across the pine belt in the 1850s, driven overwhelmingly by Tar Heels long steeped in the industry. Decades of intense production had so damaged and stressed the biology and ecology of North Carolina’s piney woods, that by the eve of the Civil War, few stands of pines remained. Boxing did much of the damage, first by seriously wounding the trees and secondly by spraying flammable wood chips about the forest floor. The fires and insects that tore through stands of wounded, working pines were bad enough, but it was the abandoned turpentine forests, the ones scarred to the limit of production and human reach that caused the most damage. The long slave-wrought faces of hardened resin were like accelerants waiting to be ignited. This confluence of death and fire led to what one historian has termed turpentine’s “Suicidal Harvest on the Move.” Beginning in North Carolina, and by the late 1850s expanding to South Carolina, Georgia, and Alabama, planters drove slaves and pines in a pyrrhic march of turpentine camps across the South.¹⁷⁵

As old camps died, operators coordinated the disassembly of the social and mechanical structures, uprooting and relocating human and mechanical laborers. For the Grist family operations, this reproduction was focused most extensively in Alabama, the southern and western limit of the pine belt, where land and labor had become remarkably cheap. Before the heat,

¹⁷⁴ Council James to James R. Grist, August 23, 1853, Box 3, CS 1853-1854, JRGBR.

¹⁷⁵ Outland, “Suicidal Harvest on the Move,” chap. 4 in *Tapping the Pines*, 98-121

before the rain, in the winter of 1857 Benjamin Grist and at least fifteen slaves began the work of disassembling the camp at St. Pauls. He felt he had something to prove to his cousin, and that summer had written, “you say I am worne out + ar brocke down + will not attend to any thing but,” he asked, “I shod lick to know whoe has beat it on 8 yars ould boxes.” Benjamin believed he was being blamed for the failing trees, writing, “I feare you ar going to desert me now becace the bisness is ould + warne out,” but, he argued, “it is the pines is warne out + not me for god knowes I have all wase done my duttey in the bisness.”¹⁷⁶ James did not desert him, but as Ben oversaw the final resin-harvest of the Gristville pines, he would find himself exiled in a sense. Scores of slaves had drained these aging pines for nearly a decade, their chipped faces extending as far as a man could reach with a hacker, and these crops were being abandoned for newer shores, newer rivers, and newer pines encircling Mobile Bay in Alabama.

First, they broke down the still that Willis Parmerly had worked five years earlier and they loaded it onto a flat resting in the waters that had claimed his body.¹⁷⁷ But they did not ship the still directly to Alabama. First, they shipped themselves. When Benjamin Grist arrived at the mouth of the Fish River in Baldwin County, Alabama, he came with slaves, axes, hackers, buckets, and a plan to transform the forest. Perhaps a third of the slaves came from North Carolina, their expertise and turpentine experience balanced against the lower cost for slaves in the Cotton Kingdom.¹⁷⁸ Losing no time, Grist drove his slaves, sometimes deep into the night (presumably lit only by pine torch and moon), to boxing the Alabama pines, beginning the process of their surgical transformation.

¹⁷⁶ Benjamin Grist to James R. Grist, Gristville, July 5, 1857, JRGBR.

¹⁷⁷ Benjamin Grist to James R. Grist, Dannelley Mill (AL), May 9, 1859, Box 3, CS May-October 1859, JRGBR.

¹⁷⁸ J. H. Farmer to James R. Grist, Mobile Alabama, March 23, 1854, Box 3, CS 1853-1854, JRGBR.

Reproducing these camps also reproduced their contradictions, and Benjamin Grist wrote defensively to his cousin, “you say I have bad luck [but] I shod lick to know whoe it is that” had not had any “negroes to runaway”? According to Benjamin, “the negros runaway becasse I made them cut boxes at knight,” only one third of the newly acquired slaves had any experience cutting boxes, and “8 of them never has got more than 60 a day yeat.” This forced reproduction of an extractive landscape violently transformed enslaved bodies as well. Pushed day and night to cut more and cut faster, field hands were made into turpentine slaves, muscles retrained, skills repurposed, and bodies forced to reveal their labor potentials to exploitative overseers. Some ran away, others were crippled before they had the chance, like “Stave Ellison [who] cut his foot last friday + he will not doe any worck in 4 weeks.” By April, when Whitfield (before his final theft) rolled into the camp “safe with Sol Grange + Jack, 8 mules + 2 waggens,” Benjamin Grist wrote proudly of his almost newborn turpentine complex that “I shall quit cuting boxes after this week [and] shall have 192000. Whitfield ses thay ar the beast boxes he ever saw.” In addition to almost 200,000 boxes, he had built a “spirits house + still house + am macking the tubes,” and he was “now reddey for the stills.”¹⁷⁹

In order for this new frontier of accumulation to avoid dying in its infancy, the camp would need stills, and need them soon. These all-important energy-transforming technologies could not be made in the camps. Some were uprooted from dead orchards like the still from Willis Creek. Others were purchased from North Carolina manufacturers like M. A. Baker of Fayetteville, who specialized in making copper stills.¹⁸⁰ But by mid-April, although the stills had been shipped for Mobile, they had not yet arrived, and Benjamin Grist was growing anxious.¹⁸¹

¹⁷⁹ Benjamin Grist to James R. Grist, Danley Mills, April 6, 1858, JRGBR.

¹⁸⁰ *Fayetteville Observer*, February 9, 1860, col B.

¹⁸¹ Benjamin Grist to James R. Grist, Mobile, April 10, 1858, Box 3, CS 1857-August 1858, JRGBR.

Already delayed “in consequence of the late arival” of the stills, “the dipping could commence now,” wrote another of Grist’s overseers. “Everything will be in readiness to put them up on arrivall,” he continued, and if “they ware up now we could comence stilling,” but if “the stills dos not arive in time I think I will dip out and get McCoy to still the Tuptine.”¹⁸²

The stills finally reached the Fish River camp by late May and were immediately put to work.¹⁸³ The reproduction was complete, and the spirits and rosin began pouring out. The usual tensions flared, although even with sixteen chippers out “we have none runaway.” There was, however, non-human resistance. “That mule is the one thay call Rock,” wrote a humbled Whitfield from Alabama, who “went after him last week but cont git him he is hard to catch I ame goinge to try that mule a gaine the last of this week I think I git him.”¹⁸⁴ This was a wily mule, and a week later Benjamin Grist wrote, “Whitfield he has a [boil] on his ass ... [and] I have not got the moule yeat.”¹⁸⁵ Ass boil or no ass boil, that mule continued to evade capture, continued to deny the camps its labor, and although Whitfield “saw him last Sunday ... I cont ketch hime [for] he is with thos wild Poney and he is hard to Catch.”¹⁸⁶

As the year wore on, slaves ran away, got sick, and were injured, but the frontier labor camp continued to hum with piney energy. By the start of the next season, Benjamin Grist had overseen the production of 1,109 barrels of spirits and 5,508 barrels of rosin, had employed 58 slaves in cutting an additional 244,000 boxes, bought three new mules, and was requesting a total work force of 89 slaves: “44 hands to schip the boxes + 21 to dip + head up the turpentin 9 at the

¹⁸² E P Patterson to Allen Grist, Fish River, April 14, 1858, Box 3, CS 1857-August 1858, JRGBR.

¹⁸³ Benjamin Grist to James R. Grist, Dannlley Mills, June 1, 1858, Box 3, CS 1857-August 1858, JRGBR.

¹⁸⁴ W. G. Whitfield to James R. Grist, Alabama, Balddins County, Danleys Mills P.O., July 27, 1858, Box 3, CS 1857-August 1858, JRGBR.

¹⁸⁵ Benjamin Grist to James R. Grist, Dannlley Mill, August 1, 1858, Box 3, CS 1857-August 1858, JRGBR.

¹⁸⁶ W. G. Whitfield to James R. Grist, Alabamma, Balddinge County, Danley Mills Post Office, August 3, 1858, Box 3, CS 1857-August 1858, JRGBR.

stills 8 to cooper 2 to hall 4 to git timber + cut wood.”¹⁸⁷ Although in the years ahead rain and then heat would threaten to unravel this geography of labor, it survived and even thrived, along with similar camps expanding across the South.

Urbanizing Piney Light

As turpentine producers compelled slaves and trees and land into reproducing these enslaving piney engines across the Southern pine belt, streams of ships and railcars ferrying spirits and rosin downriver to depots like Wilmington, Mobile, and Savannah continued to expand and intensify. From these depots of piney energy, enslaved dock workers loaded schooners bound for New York, Boston, Philadelphia, New Orleans, and Liverpool. The making of camphene thus propelled increasing numbers of slaves not only to frontier camps, but into the maritime and river industries, contributing significantly to the formation and circulation of a maritime political consciousness that the historian David Cecelski argues played a pivotal role leading to and shaping the abolitionist politics of the Civil War.¹⁸⁸ In 1850, Hussey & Murray, the Grists’ New York agents, detailed \$1120.08 in profits, most of which came from selling seventy barrels of spirits received from the schooner “Lamartine from Wilmington.” The process of moving and commodifying spirits and rosin accrued considerable costs, totaling \$152.53 and involving marine insurance, fire insurance, freight charges, charges for carting barrels around docks, “storage + labor,” coopering, gauging (standardized weighing and measuring), lighterage (transfers between boats), and advertising.¹⁸⁹

¹⁸⁷ Letters, Benjamin Grist to James R. Grist, Dannelley Mill, February 13 and February 27, 1859, and Benjamin Grist to Allen Grist, Dannelley Mill, February 27, 1859, Box 3, CS September 1858-April 1859, JRGBR.

¹⁸⁸ Cecelski, *The Waterman’s Song*.

¹⁸⁹ Hussey & Murray to Allen and James R. Grist, New York, December 28, 1850, Box 2, CS 1845-1852, JRGBR.

Through these market spaces, merchants, manufacturers, and wholesalers diverted spirits into camphene lamps. Before working women and men could fill their lamps with camphene, however, the spirits of turpentine had to be transformed into camphene. This happened at camphene manufactories, where workers further refined spirits of turpentine and then mixed it with alcohol usually distilled from whiskey onsite. The mixture, marketed variously as “camphene,” “burning fluid,” or “spirit gas,” was then measured into cans for retail. Some camphene manufacturers and dealers also manufactured lamps. Through experimentations with a variety of illuminants, Robert Edwin Dietz, a carpenter by trade, had developed a booming camphene and camphene lamp business in New York City by the 1840s.¹⁹⁰ Primary among these were Dietz’s “Doric Lamps,” advertised as “superior to all other Lamps for burning Camphene. This lamp is simple in construction, easily trimmed, and gives a great deal of light at a small expense.”¹⁹¹ These Doric lamps became cheap, mass manufactured vessels of camphene, which, according to Dietz’s memoirs, “in those days, produced the cheapest artificial light known in the world, and was widely used in New York by reason of its brilliancy and economy, by tailors, shoemakers and thousands of persons who could not afford to burn gas.” He even suggested that the “brilliancy and cheapness of camphene caused the Gas Company to spend thousands of dollars striving to produce a light of equal power.”¹⁹²

Camphene was big, flammable business, and as can be imagined, these factories too—like all the spaces enveloping the making of piney light—frequently burned down. After one such fire in 1848, newspapers described the destruction of “a large quantity of machinery, 200 barrels of

¹⁹⁰ Beckert, *The Monied Metropolis*, 53.

¹⁹¹ Classified Ad 5 – “The Doric Lamp,” *New-York Daily Tribune*, February 24, 1844, 6.

¹⁹² Fred Dietz, *A Leaf from the Past, Dietz Then and Now* (New York: R. E. Dietz Company, 1914), 74.

[spirits], alcohol and whiskey,” all estimated at \$10,000.¹⁹³ By 1859, in Brooklyn alone, the camphene industry was worth over \$2 million, almost as much as the city’s three capital-intensive gas companies, valued at \$3 million.¹⁹⁴ In Philadelphia in 1857, the industry produced 1,654,250 gallons of burning fluid worth over \$1 million, while nationally camphene manufactories transformed over 5 million gallons of turpentine (from 1 million barrels of resin) and 25 million gallons of whiskey (from 12 million bushels of corn) into 20 million gallons of camphene worth from \$9-16 million, selling between 45¢-65¢ a gallon. By the eve of the Civil War, most of the whiskey pouring into the purified alcohol industry came from Ohio River corn distilled in Cincinnati, and over 80 percent of that alcohol went into making camphene.¹⁹⁵ The lights that antebellum women reluctantly embraced to survive were world making nexuses, dragging into relation North Carolina turpentine camps, Ohio corn fields, and New York distilleries.

As social and economic pressures to work later into the night increased alongside the price of whale oil, camphene’s use continued to grow, explode, and violently consume some of the life and property its light was helping to circulate and produce. Far and away, however, camphene most commonly exploded in domestic settings. Like the night that killed Mary Clark and burned Ellen Cooley, the “lamp was burning in the middle of the table,” reported the *Pittsburg Gazette* of a typical tragedy, “while the family, with some friends, were sitting around it sewing, and otherwise amusing themselves, when suddenly, without any apparent cause the lamp

¹⁹³ “Fire in Williamsburgh,” *Albany Evening Journal*, November 18, 1848, 2.

¹⁹⁴ *The New American Cyclopædia: A popular Dictionary of General Knowledge*, eds. George Ripley and Charles A. Dana, vol. III: Beam-Browning (New York: D. Appleton and Co, 1859), 737-738.

¹⁹⁵ Edwin T. Freedley, *Philadelphia and its Manufactures* (Philadelphia: Edward Young, 1858), 146-149; “Reduction, since 1860, in the Production and Consumption of Distilled Spirits in the United States,” in *Reports of a Commission Appointed for a Revision of the Revenue System of the United States, 1865-’66*, vol. II, comm. David A. Wells, Stephen Colwell, Samuel S. Hayes (Washington: Government Printing Office, 1866), 161-162; Congress, *Alcohol in the Manufactures and Arts*, 375-381; Rufus Frost Herrick, *Denatured or Industrial Alcohol* (New York: John Wiley & Sons, 1907), 207-209.

exploded, scattering its contents in the faces and over the bodies of those within its reach.”¹⁹⁶ “In a house in Fleet street several persons were at work around a table, by the light of a camphene burner suspended over them by three chains,” described the *Boston Transcript*, when a young woman stood up on a chair to adjust the lamp and “one of the chains broke, and the lamp, with its contents flowing out in a sheet of flame, fell upon a young woman beneath, setting her dress completely on fire.”¹⁹⁷ The gendered domestic work of sewing and mending garments around a light had developed around fire hearths, candles, and perhaps the odd oil lamp. Wealthier families and clothiers displaced this violence by paying servants and seamstresses like Mary Clark to assume the risks of domestic work in such households and establishments. Gathered around camphene, this necessary social labor became suddenly far more dangerous, and, with little choice, thousands of women suffered burns and death in attempts to thread domestic work through increasingly limited urban spaces and times.

In the press and political discourses, there seemed to be little doubt that “Almost without exception, females and children are the sufferers.”¹⁹⁸ As such, camphene-related deaths became a rallying cry for a kind of consumer politics that sought legal protection for the supposedly weak and ignorant from the hazards of amoral market forces. E. Meriam, a politically active “weatherman” and watchdog from Brooklyn, exemplified this trend in his impassioned plea that if “men who deal in this dangerous compound care nothing for the results, nothing for the loss of precious human life, nothing for the agonizing and most painful of deaths, nothing for the pains, the sufferings, the unfortunate victims endure, nothing for the loss of millions of property consumed by fire originating in the use of burning fluid,” that the New York State legislature

¹⁹⁶ “Explosion of Etherial Oil,” *Alexandria Gazette*, October 13, 1856, 2.

¹⁹⁷ “Sad Accident from Camphene,” *Spectator*, August 15, 1850, 2.

¹⁹⁸ “Camphene,” *Scientific American*, March 2, 1850, vol. 5, no. 24, 189.

should “prohibit its use by the severest penalties;” and fire insurance companies “should refuse to underwrite for buildings or other combustible property, in every case where camphene or burning fluid is used in the building or in any adjoining building.”¹⁹⁹

Indeed, it was not only life that was under assault by camphene. Property and the urban environment itself were seen as perilously at risk. The millions of dollars lost to camphene fires over the 1850s, suggested the *Newburyport Herald*, were a “greater sum than all the pecuniary profits ever derived by all the manufacturers engaged in the making of those life-destroying fluids.” But if the practical condemnation of camphene highlighted the destruction of capital, it was to the hundreds of lives lost every year that reformers turned to make their moral appeal. In both cases, there appeared to be a reluctance to absolve commercial relations of social responsibility, for when “we take into account the small number of persons engaged in the manufacture of burning-fluids, and compare their number with the great number of deaths these manufactures have caused, each one's share in the work of death will be found to have been fearfully great.”²⁰⁰ Nevertheless, no mention was made of the slaves of who produced turpentine, nor did any abolitionist boycott of camphene emerge as it did for cotton. Instead, campaigns against camphene were commonly and explicitly tied to temperance movements (no doubt influenced by the strong material connection between camphene and the alcohol industry), emphasizing individual moral responsibility.²⁰¹

These explosive lights were politicized, moreover, into a discourse focused on using public resources to eliminate the need for personal lamps. *Scientific American* helped to lead the charge to replace camphene, writing hopefully “that the time is not far distant, when every private house,

¹⁹⁹ “What is Camphene Doing,” *Plattsburgh Republican*, November 11, 1854, 2.

²⁰⁰ Newburyport Herald, “Camphene Statistics,” *Lowell Daily Citizen and News*, May 31, 1859.

²⁰¹ For a good example of the equation of temperance and refraining from using camphene see Mary Hinckley, *The Camphene Lamp; Or Touch Not, Taste Not, Handle Not* (Lowell: J.P. Walker, 1852).

as well as the public ones, in our cities, will be illuminated with good, safe gas, publicly manufactured at a cheaper rate than either, oil, candles, camphene, phosgene, oxygen, or all the phenes (fiends) of spirit gas whatever.”²⁰² The violent toll of camphene was such that every “improvement which tends to cheapen gas light is an incalculable boon to the human family.”²⁰³ But gas spread slower than the need for working-class lights. Camphene lamps continued holding women hostage, while the geography of turpentine continued to expand, enslave, and transform frontiers across the American South.

Conclusion

Those who made and used piney light had not asked for it. It was not their progress. The slaves, wage laborers, seamstresses, and domestic workers who assumed the sometimes terrible risks of working with turpentine did so not because they wanted to, but because they had to. It was others (husbands, employers, slaveholders) who reaped the rewards of all the dangerous unpaid and underpaid work in home, shop, and forest. As the turpentine industry spread across the South, it transformed entire regions, uprooted and destabilized communities and ecologies, and, until the eruption of the Civil War, showed no signs of slowing its centrifugal expansion of new frontiers of accumulation. These frontier armies of enslaved light makers were the ignored and eclipsed counterparts to the swelling, ever-brighter antebellum industrial cities. The story of piney light was an antebellum story of expansion and concentrated contraction, of bundling and accumulating labor in slums and in frontier camps, of centralizing and expanding planters’ and industrialists’ power in woods, cities, rivers, and rail.

²⁰² “Camphene,” *Scientific American*, March 2, 1850, 189.

²⁰³ “Camphene, Burning Fluids, &c.,” *Scientific American*, October 8, 1853, 26.

Pushing people, energy, and surplus value up and downstream, with and against the friction of the terrain, required new social and spatial arrangements of power and energy and time. Pushed out of farms and villages from all over the world, the new urban working classes and poor had limited options and means with which to support and sustain the basic social processes of life. The means of such vital processes as shelter, food, clothing, water, heat, and light were securely controlled behind bulwarks of property, accessible only through money or theft. Making a living in these cities, therefore, usually meant working for money, and building and illuminating a life out of the cheapest, and quickest, materials available. Urbanization, and the speed with which it occurred in the United States, could not have happened without cheap light. Working-class families, stretched thin by low wages and long workdays, could never have gathered and survived in sufficient numbers for cities to industrialize had they been unable to meet their own vital and social needs during the dark hours left to them.

The making and consuming of piney light, therefore, aligned for a few decades the exploitative geography of naval stores with the outsourcing forces of industrialization and urbanization, internally relating turpentine camps with tenements, the labor of boxing with that of sewing. This alignment was hardly permanent, and indeed its precarious spatial relations were continually threatening to unravel piney light. In the end, it was not the rain, the floods, the explosions, nor even the escapes that extinguished the lights of camphene. It was the Civil War and the fortuitous advent of a chemically similar and securely Northern illuminant in petroleum-derived kerosene that severed these relations. The Civil War interrupted and destroyed the enslaved geographies of turpentine, and by the time the industry reinvented itself with freed and convict labor to feed new chemical industries, naval stores, as had happened to whaling, had

already grown dark.²⁰⁴ The darkening of turpentine, moreover, also crippled the alcohol industry for generations.²⁰⁵ The lamps of labor had found new, even cheaper fuels in kerosene and lard oil, while coal gas continued its march outward from enriched industrial urban cores. The next chapter tells the history of those gaslights and the dungeons and dragons they unleashed in antebellum America.

²⁰⁴ Outland, *Tapping the Pines*, 122-206.

²⁰⁵ Congress, *Alcohol in the Manufactures and Arts*, 375-381; Herrick, *Denatured or Industrial Alcohol*, 207-209.

CHAPTER THREE

Dungeons and Dragons: Slavery, Industry, and Modernity in Coal Mines, Gas Works, and Antebellum Gaslights

The future had arrived in New Orleans, and everyone seemed to know it. In 1834, in the muggy heat of spring, reporters marveled as workmen dug up streets, laid over two miles of foot-wide iron pipes, and began construction—a few blocks west of the city’s bustling slave markets, near the Charity Hospital. Located between Perdido, Gravier, St. Marc, (now Magnolia) streets—of a massive cast-iron tank over fifty feet in diameter. This cistern, the observers claimed, was “the most extraordinary work ever seen in this country,” and “will surprise all those unaccustomed to look at improvements upon a large scale.” With a foundation of 100,000 bricks and a holding capacity of over 120,000 gallons, the remarkable container was meant to hold illuminating gas, a new material of the age, and by mid-June, the station where that gas was to be manufactured was drawing further attention. Even the wrought-iron roof of this building seemed to defy description, and “having no technical phrase at hand, we shall merely say, that at the same time it appears to be the lightest construction possible, it has to the eye an appearance of strength.” Meanwhile, James H. Caldwell, the actor and theater owner responsible for funding and building the awe-inspiring New Orleans gasworks, had become a regional celebrity, to whom, local papers declared, “this city, and indeed the valley of the Mississippi is indebted, for the introduction of that beautiful, safe and economical light by gas.”¹

¹ “Gas,” *Baltimore Gazette and Daily Advertiser*, June 25, 1834, 2; “New Orleans, June 10,” *Southern Patriot*, June 20, 1834, 2.

By early August, the public had gathered around Caldwell's theater to witness the first trial of his much-heralded gasworks. And this thespian knew how to make an impression. "The beautiful flame above the theatre, representing the Trident of Neptune, exceeded any thing of the kind that we have ever seen," reported news writers as they watched gas blaze forth into the symbol of a god.² In the bright white flames issuing from these and countless other fixtures, boosters saw visions of a prosperous gas-lit industrial region radiating from the great Mississippi. "Before many years," they proclaimed, "it is not difficult to foresee that every city, town, village or Hamlet, in the Western and South Western country, will be lighted with gas." Indeed, this coal-fired future seemed almost inevitable, "because the light is in every respect, so far superior over every other, and the materials of which it is composed, so plentiful and cheap." With perhaps some exaggeration and wishful thinking, the report estimated that the "manufacture of gas for the light of this city alone, would consume, suppose the whole city to be lighted, 300,000 barrels of Pittsburg coal, which after making gas for the supply of 30,000 lamps, would leave 400,000 barrels of coke, to serve steam boats, locomotives, kitchens &c."³ New Orleans, by draining the rocks and riches of all the waterways flowing into the Mississippi—by stockpiling the coal arriving on its wharfs from the mines of Pittsburgh, Kentucky, and western Virginia—imagined itself poised to gaslight its way to regional and national prominence.

Hundreds of miles away, outside of Richmond, another future of coal and dreams was under construction. Abraham S. Wooldridge was hoping to mine his (and his region's) way to fame and fortune. The 1830s was a pivotal decade in the history of bituminous coal, the only kind of coal that could be used to make coal gas. Virginia, long the center of the coastal American coal trade, had begun to exhaust the easily accessed shallow and surface-level

² "From the New Orleans Bulletin of the 9th. Gas," *Daily National Intelligencer*, August 25, 1834, 3.

³ "New Orleans, June 10," *Southern Patriot*, June 20, 1834, 2.

outcroppings in the Richmond basin. There were still mountains of coal under tidewater soil, but they were deep, expensive to reach, and dangerous to mine. Pennsylvania's chaotic Jacksonian political economy, meanwhile, had produced a flurry of public works and internal improvements, dredging canals and improving roads all over the state. The system was far from perfect, but it opened up the vast western bituminous coalfields around Pittsburg to markets in the Ohio and Mississippi valleys. Yet in contrast to how most historical narratives have compared the rise of Pennsylvania and the fall of Virginia in the United States coal industry, the Richmond mines remained some of the country's most important and profitable through the end of the Civil War, especially in relation to gaslight.⁴ During the antebellum period, Richmond mines were the chief American suppliers of gasworks along the eastern seaboard, including in Boston, New York, and even in Philadelphia.

If mid-Atlantic and New England cities could have made gas from the cheap, abundant (and far more famous) anthracite coal being mass-mined in eastern Pennsylvania, they would have done so in an instant and the Richmond mines would have fast become a colonial relic. But they could not. Anthracite coal, with its dry, high carbon purity, was useless for making gas, unless as a fuel to fire the retorts. Cities and industrialists needed the oily, gas-rich bituminous, and while cities in the Ohio and Mississippi valleys could make use of Pittsburgh coals, for those on the eastern seaboard before the Civil War, the only affordable and accessible options were

⁴ Sean Patrick Adams, *Old Dominion, Industrial Commonwealth: Coal, Politics, and Economy in Antebellum America* (Baltimore: Johns Hopkins University Press, 2004). Adams argues that this divergence was largely a function of differing political economies—Pennsylvania was able to heavily invest in infrastructure to develop its eastern and western coal regions, while Virginia's political economy was captured by agrarian eastern planters who mistrusted Richmond-area colliers and actively prevented development of the massive coalfields in western Virginia. As a manufacturing fuel for the eastern seaboard, Pennsylvania anthracite (or stone coal) outstripped Virginia bituminous, but anthracite was completely useless as a gas coal, and it would be foolish to write off the Richmond coal industry as underdeveloped and noncompetitive. While Pittsburgh sent hundreds of thousands of tons of coal downriver towards Cincinnati, St. Louis, and New Orleans, for the major portion of the antebellum decades, New York, Boston, and even Philadelphia gasworks continued to rely primarily on Richmond and British coals. Political economy offers an explanation for why the vast coalfields of western Virginia remained undeveloped relative to adjacent western Pennsylvania deposits, but it can overstate the success of Pittsburgh and the demise of Richmond.

Richmond bituminous and the tariff-inflated cannels from Scotland and Wales.⁵ Abraham Wooldridge foresaw these possibilities, and as James Caldwell's trident brightly announced a new industrial west, burning Pittsburg coal at the heart of the cotton kingdom, Wooldridge was busily reinventing and reimagining the future of the Richmond coal basin. And this too was an industrial future built on capital, privilege, and slaves.

Wooldridge was not the first to try to find fortune in the mines of the Richmond coal basin, but he was nonetheless starting something new. In 1835, the General Assembly of the Commonwealth of Virginia incorporated the Mid Lothian Coal Mining Company with over 400 acres of lands and abandoned mines located about twelve miles southwest of Richmond. According to the act of incorporation, the lands and mines were valued at \$300,000, "one half of which is required to be sold," and with this gift of the state, "the proprietors have with great liberality, set apart \$100,000 as permanent capital to work the property. That sum being deemed sufficient to purchase the necessary hands and engines and to sink shafts, will enable the company to enter into the coal business under circumstances decidedly more advantageous than any heretofore carried into operation."⁶

The key to this advantage, what made this venture so promising, was capital. As the Wooldridge family explained in the founding charter of the company, they had been "born and raised in sight of the Chesterfield coal mines ... and know practically the disadvantages attending the want of capital, and they risque nothing in advancing the opinion, that most of the failures to acquire wealth in the prosecution of the coal business hitherto have been attributable to that

⁵ Harold F. Williamson and Arnold R. Daum, *The American Petroleum Industry: The Age of Illumination 1859-1899* (Evanston: Northwestern University Press, 1959), 39; Ronald L. Lewis, *Coal, Iron, and Slaves: Industrial Slavery in Maryland and Virginia, 1715-1865* (Westport: Greenwood Press, 1979), 6-7; Jane Brox, *Brilliant: The Evolution of Artificial Light* (Boston: Mariner Books, 2010), 58-76.

⁶ "Mid Lothian Coal Mining Company," *Richmond Whig*, September 4, 1835, 2.

cause.” With this act of incorporation, however, and the \$100,000 of capital appropriated in the process “it is conveniently believed no failure to realize in profits, a product equal to the prudent wishes of the most sanguine adventurer will occur.” Capital was control—over present and over future—for “where the lands, hands, engines and fixtures are all owned by the company, it must be evident that a permanent business may be established with the prospect of immense profits.”⁷ With this capital, Wooldridge envisioned a future in which his company raised one million bushels of coal each year, worth \$90,000 at the pits, “and when nothing but feeding and clothing of the hands employed, the wages of superintendents, the cost of oil, ropes, iron, powder, timber, &c. are to be deducted, it will occur to persons conversant with the expenses of coal mines ... that \$20,000 will defray the whole necessary annual expense of a force greatly more than necessary to hoist a million of bushels of coal.”

Lest anyone was skeptical, he provided a more detailed estimate of costs. First, labor: “For clothing and feeding 140 hands at \$50 each, \$7,000.” Without the necessary capital, those hands would have to be hired, instead, at twice the cost. A management team of two superintendents “(1 at the yard, and 1 at the pits),” two overseers, and two clerks employed to control, coordinate, and discipline that labor, meanwhile, would be paid \$5,500 or nearly the same spent on the 140 “hands.” The means of production he estimated at less than half the human costs, with \$5,000 evenly divided among powder, iron, oil, ropes, and timber. The \$1,000 spent on oil to light the underground work of mining, then, would be equivalent to provisioning twenty additional slaves. Finally, \$2,500 was to be set aside for “contingencies.”⁸ The charter

⁷ Mid-Lothian Coal Mining Company, *Charter, scheme, and conditions of subscriptions of the Mid Lothian Coal Mining Company* (Richmond: S. Sheperd, 1835), 4-5: quoted in Nancy C. Frantel, *Chesterfield County Virginia Uncovered: The Records of Death and Slave Insurance Records for the Coal Mining Industry 1810-1895* (Westminster, Maryland: Heritage Books, 2008), 123-142.

⁸ Mid-Lothian Coal Mining Company, *Charter, scheme, and conditions of subscriptions...*, 5-6.

articulated a new, powerful vision of slavery, industry, and capital. In such a vision of industrial slavery, human labor, indeed all work, became perfectly incorporated into the machine. Labor could be measured in energy inputs and materials: \$7,000 for powering 140 human bodies, \$4,500 for powering 60 mules, and \$5,000 to blast rock, illuminate work, support the weight of mountains, and transfer muscle power through tools. This was a view of slavery that any engineer could understand.

But this was not just a well-oiled machine absorbing and rationalizing human labor, it was a social engine designed to bring about a bright new industrial future for slaveholders. “It will be perceived,” acknowledged the authors, “that a force equal to 140 hands is carried out in the preceding estimates. That force is greatly more than sufficient to hoist a million of bushels of coal.” But even if such a force were necessary, the “capital of \$100,000 is not large enough for the other necessary purposes and to purchase more than about 100 hands, nor will this number be actually wanted at the pits for many years.” In fact, only about twenty-five slaves would be needed to sink the first shaft, and “the whole number of 100 hands will not be required for several years after the commencement of hoisting coal.” Yet they would still be invaluable, they would still be engines of surplus. The extra slaves “during these years should be hired out,” he argued, and the profits be reinvested to “form an accumulating fund for the purchase of additional hands over the 100, as they may be required in the future prosecution of the works, and supply any additional engines and shafts that may be necessary.”⁹ This chapter tells the story of the worlds set in motion by these two dreamers, Caldwell and Wooldridge. It traces the dark chains of coal, gas, and capital that lashed together dungeons and dragons, slaves and wage

⁹ As mentioned above, slaves could be hired out to other mines at a rate twice what it cost to feed and clothe them. Mid-Lothian Coal Mining Company, *Charter, scheme, and conditions of subscriptions...*, 9-10.

laborers, North and South into powerful antebellum engines of futures bathed in gaslight. And it returns, now, to New Orleans, where just such a future was beginning to take form.

The Light of the Future: Gaslights, Slavery, and Modernity

Strolling through the completed New Orleans works, reporters from the *Picayune* were overwhelmed not only by the size and scale of the operations, but by their intricate, immaculate precision. “The handsome white chimney of the great furnace, in architectural elegance, resembles more some hero’s monumental pillar, than a passage to create draft and carry off dense coal smoke,” waxed one article. These works were a monument to patient management and refined industry, as the “fine taste and untiring activity of Dr. Rogers in superintending this immense establishment, have wrought their effects in making it an object of great and pleasing interest. The ground has from year to year been gradually elevated, and is now high, dry and secure. The stores of huge iron pipes and other machinery are so arranged as to ornament and give picturesque effect to the place.”¹⁰ Perhaps even more important than its industrial beauty, however, was its industrial order. If they had not witnessed it themselves, the writers claimed, “the perfect neatness and order with which every department of the vast establishment is carried on would scarcely be credited.”¹¹

This was a new order, an embodiment of the age: not just the quiet precision of a well-made pocket watch, but an industrial order of perpetual motion, heat, light, and sound—an order produced through mastered chaos. “Where huge furnaces are day and night and from year to year in an intense and perpetual glow,” observed reporters from the *Picayune*, “where ship loads of coal are constantly consuming—where lime kilns are burning, and pyramids of coke are

¹⁰ “The New Orleans Gas Works,” *Daily Picayune*, March 23, 1842, 2.

¹¹ “The Gas Works,” *Daily Picayune*, September 9, 1840, 2.

piling up,” one would expect such a place to be one “of smoke and dust and sut [sic] and vallanous [sic] odors.” Yet, in what was almost certainly a gross exaggeration, the *Picayune* asserted that on “the contrary, lady visitors [sic] may promenade the gas works, walk the fire rooms, the condensing rooms, the blacksmith shop, the carpenters, examine the gasometers, the scales, the pipes, the steam engine, the whole complicated apparatus of the place, and not soil a white satin slipper.”¹² A few years later they repeated these incredible claims in “a hint to transient sojourners here ... that they should by no means leave the city without viewing the Gas Works,” once again advertising that the “whole establishment, too, is kept in a state of cleanliness, considering the nature of the work carried on, that is really astonishing. Upon the level floor of the yard a pair of dainty satin slippers might trip through a waltz, and make no acquaintance with the sooty coal dust.”¹³

This new species of light was built of iron and it was built of ink. More so than any previous lighting technology, gaslights were manufactured as much in the minds and visions of consumers, investors, social commentators, and public officials as they were physically constructed over city blocks and under city streets. The labor of their creation and operation always emerged through two different but interrelated kinds of space. In one, which might be called the absolute space and time of the city, labored builders, fitters, and pipe layers; engineers to oversee the men and machines of the gas works; and teams of men to store and transport the coal, stoke the ever-burning fires, and load, empty, and reload coal into the gas-making retorts. The other, was one of ink and paper, a space of newspapers, scientific journals, and engineering

¹² “The Gas Works,” *Daily Picayune*, September 9, 1840, 2.

¹³ “The New Orleans Gas Works,” *Daily Picayune*, March 23, 1842, 2.

manuals.¹⁴ Reporters, engineers, illustrators, journal editors, typesetters, engravers, press operators, and newspaper deliverers produced, often in the midnight glow of real gaslights, printed representations of those lights. Unable to physically burn, these paper lights instead projected sanitized visions of illumination that shaped not only how people talked and thought about these lights, but how, when, and where people operated and reproduced them. The paper lights, moreover, were social objects, actively shaping and producing lived social spaces as men and women made, reproduced, distributed, and read them with one another. Understanding the relations, frictions, and contradictions in the making of these two kinds of gaslight, printed and combusting, is critical. Any chance at recovering the true social, spatial, and political implications of gaslight depends on it.

The works themselves were arranged over an “immense square” between Perdido and Gravier streets. These staging grounds for the manufacture of light were unmistakably marked by the material processes of production. “Mountains of coal are piled up in nice regularity, under substantial sheds erected for the purpose,” described one reporter, while in one corner of the square a “vast limekiln is employed in the manufacture of lime from oyster-shells,” lime being an important product used to rid the raw gas of sulfur and soot. Coal and lime, however, were only the raw materials of light. At the opposite end of this process, three “stupendous gasometers occupy positions within the square, and look like iron cages or cauldrons in which wicked genii are enchained.” And the gas genies in these industrial lamps were not the kind one wanted to awaken. If ignited inside a gasometer, such a gas explosion could level a city block, or at the very

¹⁴ For further discussion of the production of space, see: Henri Lefebvre, *The Production of Space* (Anthropos, 1974), trans. Donald Nicholson-Smith (Blackwell, 1991); David Harvey, *Justice, Nature and the Geography of Difference* (Blackwell, 1996); and Richard White, “What is Spatial History?” *Spatial History Lab*, Stanford University, February 1, 2010.

least set fire to the surrounding area.¹⁵ Indeed, gasworks were intended to be vast social lamps where the flames were kept as far as possible from the font. This meant the font, or fuel reservoir, could be made hundreds of thousands of times larger than that of an ordinary table lamp, and displaced, through a network of pipes, from any domestic, commercial, or public spaces.¹⁶

In describing the process of gas manufacture, the *Picayune* painted a picture of passive, almost natural production. “After the generation of the gas,” the paper reported, “it is passed through an immense number of iron pipes called gas washers, ... After this process of cleansing with water the gas passes through what are called gas purifiers; they are large wrought iron boxes, in which are placed perforated iron plates, covered with lime.” Once washed and purified, the “gas then passes through the grand metre, and thence to gas-holders or tanks, where it remains until conveyed through the pipes around the city.” From generation to distribution, not an iota of human work was seen as necessary to report. Gas was simply supposed to happen automatically and nothing embodied this more than the station meter. “The metre is a very ingenious and beautiful piece of workmanship,” waxed the *Picayune* writer, “telling with the accuracy of a clock the exact amount of gas made each day.” And not only did it measure and control the outflow of gas with incredible precision, the meter actually performed the work of record keeping with “a contrivance attached to it, called a tell-tale, which, by means of a pencil and a sheet of paper attached, informs the superintendent, by looking at it, the precise rate of gas produced at any and all parts of the day.”¹⁷ This kind of industrial clockwork found further resonance for consumers in the individual meters automatically admitting and measuring all the gas consumed in a given house or business.

¹⁵ Peter C. Baldwin, *In the Watches of the Night: Life in the Nocturnal City, 1820-1930* (University of Chicago, 2012), 30; Jane Brox, *Brilliant: The Evolution of Artificial Light* (New York: Mariner Books, 2011), 70.

¹⁶ “The New Orleans Gas Works,” *Daily Picayune*, March 23, 1842, 2.

¹⁷ “A Glance at the Gas Works,” *Daily Picayune*, April 4, 1850, 2.

Gasworks were more than just self-operating refueling and distribution centers, however. They were also the sites where all that fuel was manufactured, and thus it was impossible to completely ignore the human labor supporting these processes. Reporters described this activity at Perdido street, writing of “the workmen going through their variously apportioned employments, as the vast piles of coal disappear in the ovens, and the gas is generated! This is a spectacle of riveting interest, and is constantly going on. When the doors of the ovens are opened, the rapidity with which the coke is removed and fresh coal locked up in thrice seven times heated iron cages, is most remarkable.”¹⁸ Indeed, this heat and speed was so remarkable that another article suggested the “tremendous and continual fires kept up in the furnace, remind one of the hot place we read of, and the workmen who attend them must be almost salamanders, to endure the heat.”¹⁹ Salamanders, mythical creatures of fire: these workers were as living manifestations of the elements, inhuman creatures of a mastered industrial hell. Perhaps to reduce narrative friction with the automatic elegance of metered, purified gas, boosters cast these workmen as almost unnatural native beings, channeling and part of the tremendous forces flowing through the machine. And it was not the only time the laborers who opened, emptied, and refilled fiery gas retorts (iron or clay ovens that transformed coal into gas and coke) were portrayed in such terms. Years later *Harper’s Weekly* described a visit to the Manhattan Gas Works, in which the fire lit under the lines of retorts “burns entirely around them with a fierce heat. Into these retorts the coal is put by gangs of stalwart men, who play about in the fire like salamanders, seeming really to enjoy the burning.”²⁰

¹⁸ “The New Orleans Gas Works,” *The Daily Picayune*, March 23, 1842, 2.

¹⁹ “A Glance at the Gas Works,” *The Daily Picayune*, April 4, 1850, 2.

²⁰ David Biggs, “Gas and Gas-Making,” *Harper’s New Monthly Magazine*, December 1862, 20.

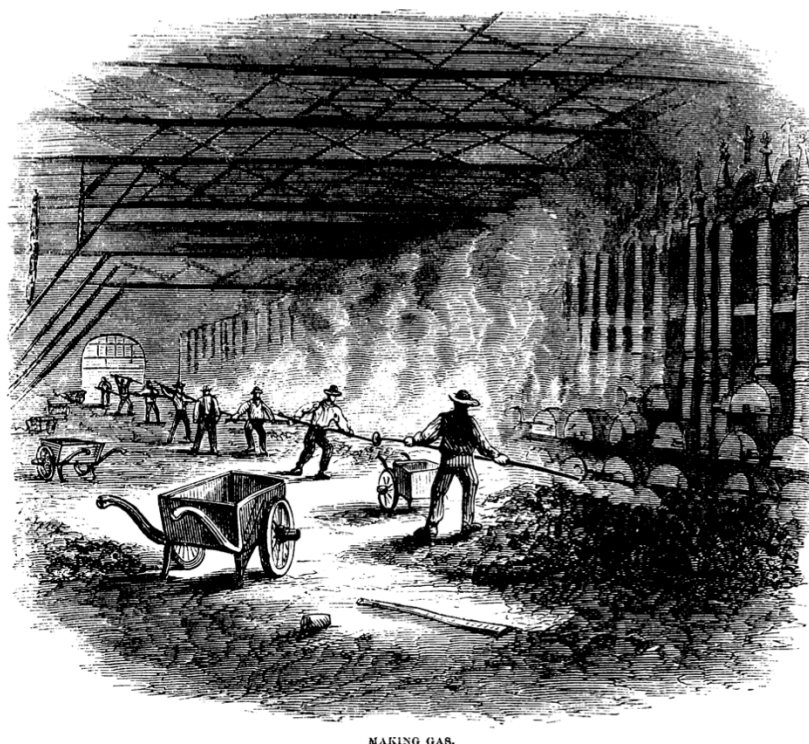


Figure 3.1. “Making Gas.” *Harper’s New Monthly Magazine*, December 1862, 16.

But these workers were not salamanders. They were not industrial forces like heat or steam to be engineered and harnessed. They were men, and at least in the New Orleans works they were most certainly not there “to enjoy the burning.” Indeed, although one might never know it from reading the dozens of articles written about the antebellum New Orleans gasworks, they were operated almost entirely by slave labor. “All manual labor was slave,” according to one historian of the city, “whites being employed only in supervisory capacities,” while the slaves and their families “lived in quarters inside the walls of the plant.” When Caldwell died in 1860, company books listed \$53,000 in “live assets,” and newspapers reported the public grief of his loving slaves. Whether this grieving was for Caldwell or for their own futures was mostly besides the point, for “in any case, Caldwell had erected a fifteen-foot brick wall and a first-class set of iron gates to insure the affections of his chattels.”²¹ In 1901, the *New York Times* picked up a story

²¹ Harold Sinclair, *The Port of New Orleans* (Garden City, N.Y.: Doubleday, Doran & Company, 1942), 191.

of the company during the Civil War, which reported that “after going over the books of the New Orleans Gas Light Company ... the money losses sustained by the corporation through the emancipation proclamation of President Lincoln were \$51,650. This amount represented the value of sixty-two slaves owned by the company at the time of the occupying of New Orleans by the Federal forces.”²²

This was not simply some “pre-capitalist” labor force assembled to make do until free wage labor became available. In 1836, according to the article, the company only “maintained a few slaves who were put to work about the station.” The supervisors and owners were English, and presumably they were as, if not more, familiar with wage labor. It seems that for the first decade or so, Caldwell and Dr. Rogers, his superintendent, tried to run these works mostly with hired workers (who may or may not have been slaves), and “the sweeping substitution of such [slave] labor for white labor was not made until 1848.”²³ Regarding white labor as simply too expensive and unreliable, in 1848 the company explored, according to its minutes, “the practicability of substituting slave labor for white labor at the station and on the street main, as well as lighting the public lamps, ... and after discussion the apparent economy of slave labor, from the estimate of the engineer, determined the board to authorize the engineer to make the experiment ... to purchase from time to time ... such slaves as will answer the purpose contemplated, either as stokers and laborers, as well as the necessary mechanics to supply the place of the white labor now of necessity employed at so large an expenditure.”²⁴ This was a modernity explicitly dependent on slavery. Gaslight, the citizens and engineers of New Orleans believed, was the *sine qua non* of science, progress, and western civilization, and slavery, they

²² “Echoes of Slavery Days,” *New York Times*, June 29, 1901, 10.

²³ “Echoes of Slavery Days,” *New York Times*, June 29, 1901, 10.

²⁴ “Echoes of Slavery Days,” *New York Times*, June 29, 1901, 10.

made clear, was essential to it. The decision to purchase an industrial labor force did more than provide the city of New Orleans with light more efficiently. It cast real bodies and lives into disruptive motion over considerable distances.

When Davy discovered that his owner had sold him, again, he could have had no idea that his life was being uprooted to feed the greedy dreams of a gaswork's masters. Davy may not even have known what a gasworks was, it being just over a year since Caldwell first fired his gas trident above the theater. The man who arrived in Mississippi to take Davy away from the chain gang may have let him know that he was headed for New Orleans, but that was hardly unusual. Thousands of slaves were sold to and from New Orleans every year. Court records show that a slave trader named Calvin Smith purchased Davy from the chain gang, marched him to New Orleans over a month-long journey, and sold Davy to a New Orleans trader named George Botts for five hundred dollars. According to later testimony, Botts had met earlier with Dr. Rogers, the superintendent of the gasworks, having "heard that the company wished to buy slaves," and told Rogers that although "he had not then on hand any that would suit them, ... a friend of his had gone to Mississippi to purchase prime slaves, and that if he could wait a few days, he would furnish him such a one as would suit."²⁵

When Davy and a frustrated Smith arrived in New Orleans, apparently Smith "represented" Davy to Botts "as a subject very hard to manage." The forces and decisions that had resulted in Davy landing first in a Mississippi chain gang, and then being sold south to New Orleans were, while largely outside his control, still something he could exploit. It was a chance, however limited, to transform suffering and hardship into new possibilities. Both he and Botts knew that it was to Botts's advantage to hide or reinvent Davy's history. An unruly slave with a

²⁵ The New Orleans Gas Light and Banking Company v. George R. Botts, 9 La. 305 (1844).

stint in a chain gang would be difficult to sell for much. Davy had just as much, if not more of an interest in leveraging Botts's greed into a clean slate for himself. Without the baggage of his history, if Davy was careful and sufficiently skilled he might be able to shape not only his passage through the market, but the conditions and possibilities of his life after sale.²⁶

A few days after Davy arrived in New Orleans, Botts spotted Dr. Rogers "passing in his gig," and pulled him over to examine Davy. The ruse was successful, for Botts. He resold Davy to Rogers for at least \$1050, more than twice what he paid initially. Whether Davy managed to shape his life effectively after sale is less clear. There are no records of his treatment, labor, or oversight in the gasworks, but two months after Rogers bought him, Davy ran away, successfully escaping his enslavement and his history. Without a laboring body, all that remained of the relationship between Botts and Rogers were debt and lies. Able to prove deceit, Rogers prevailed in court, and Botts was eventually forced to pay \$1050 in damages.²⁷

The benefits of having property rights in labor, even when that labor stole itself, would not have been lost on Caldwell and Rogers. First of all, Davy almost certainly performed productive labor at the gasworks for two months, labor that if paid for in wages could never be reclaimed. When Davy ran away, however, that labor became better than free so long as the gaslight company could make Botts repay them not only for Davy's past, but his future labor. As Davy threaded his history, body, and labor through the slave market and the New Orleans Gas Works, he left behind not only the products of his labor and his enslavement, but the value of his past and future life in bondage.

²⁶ *The New Orleans Gas Light and Banking Company v. George R. Botts*; see also Walter Johnson, *Soul by Soul: Life inside the Antebellum Slave Market* (Cambridge: Harvard University Press, 1999).

²⁷ *The New Orleans Gas Light and Banking Company v. George R. Botts*, at 305.

For engineers and owners of a highly capitalized industrial operation, this kind of certainty and long-term planning was ideal. As countless studies have shown, factory owners using wage labor took considerable measures to turn human labor into a part of the machine, to make them interchangeable factory components.²⁸ This was the logic of the engineer, to control and plan a perfectly functioning machine with no will of its own. Industrial slavery promised to make this a legal reality even as it faced the same kind of human-machine frictions as in a wage system. The point is that there was no inherent economic or cultural dissonance between slavery and industrial capitalism; in many ways slave labor aligned more closely with the plans and fantasies of engineers and capitalists suspicious of workers.²⁹ If workers could actually, legally, be owned as cogs in a machine, then the future plans and operations of a closed system (how all engineering planning is done) could actually make sense. Social relations outside the firm would no longer matter. Even today we fear (or cheer) the idea of human workers being replaced by robots. Visions of a future liberated from human toil have always flagged celebrations of science and progress. It is what engineers have been aiming at for centuries, and slavery, by obscuring the humanity of workers, matched this much more closely than wage labor.

Clearly, most of the slaves kept at the works did not escape, and as the works expanded to provide light to more of the city, the number of slaves living and laboring within the walls of the yard continued to grow. Just as it was with turpentine, these were boom times for industrial slavery as much as they were for industrial wage-relations. And the two were clearly related. Northern operators shipped mountains of coal mined by (mostly) “free” laborers in western

²⁸ For a few examples, see: Karl Marx, *Capital: A Critique of Political Economy*, vol. 1 (any edition); Lewis Mumford, *Technics and Civilization* (1934, 1963; Chicago: University of Chicago Press, 2010); E.P. Thompson, *The Making of the English Working Class* (New York: Vintage Books, 1963); Raymond Williams, *Marxism and Literature* (New York: Oxford University Press, 1977); Herbert G. Gutman, *Work, Culture, and Society in Industrializing America* (New York: Vintage Books, 1976).

²⁹ Robert S. Starobin, *Industrial Slavery in the Old South* (Oxford, 1970), 10-34.

Pennsylvania, Ohio, Illinois, and Missouri downriver into southern social landscapes made and sustained through the continual exploitation of enslaved human beings. Industrial visionaries like Caldwell, meanwhile, wove waged coal and enslaved bodies into fame, fortune, and an emerging Mississippi-valley industrial order.

In only a matter of years, the gas-lit empire foretold by that trident of fire was already becoming a reality. From the spectacularly staged works in New Orleans, James Caldwell wielded newspapers, theater, and capital to project gaslit visions into the imagined futures of southwestern cities. By 1841 Caldwell had won exclusive contracts to supply New Orleans, Louisville, Mobile, Havana, and Cincinnati with gas.³⁰ This was no simple sell. Gasworks, with their miles of underground pipes, enormous cast iron gasholders, and round-the-clock manufacturing plants, required huge expenditures of capital and labor to construct and implement. Yet by 1845, not only were the New Orleans works regionally famous, gaslights burned steadily in Louisville, Mobile, and Cincinnati. In Cuba, meanwhile, the *Daily Picayune* reported the “gas works in Havana are getting on famously,” where “eighty men are continually employed, and nothing but the weather delays the completion of the works.”³¹ St. Louis followed a year later by contracting with a “Mr. G. F. Lea, of Philadelphia, for the erection of a Gas Works and the laying down of ten miles of main-pipe within eighteen months” at a cost of \$170,000.³²

After all this time, money, and labor had been sunk into these systems, after retort, gasholder, main, and fixture had been joined in a circulation of heat, gas, and flame, the social

³⁰ “Gas in Mobile,” *Commercial Advertiser*, September 26, 1836, 2; *Baltimore Gazette and Daily Advertiser*, October 25, 1836, 2; *Public Ledger*, March 23, 1837, 2;

³¹ *Alexandria Gazette*, June 22, 1837, 3; “James H. Caldwell,” *Alexandria Gazette*, August 16, 1843, 3; *Daily Picayune*, October 26, 1845, 2.

³² “St. Louis Gas Works,” *Daily Picayune*, July 4, 1846, 2.

lives of these industrial gaslights were only just begun. By 1850, with the New Orleans works fully transitioned to slave labor, there were “consumed in the works, daily, about 232 barrels of Pittsburg coal, 290 barrels being the most ever” used in a single day. Fed into retorts by slaves working in shifts around the clock, this coal was transformed into around two-hundred thousand cubic feet of gas over the course of each day, “and the largest amount ever consumed in this city in a day, was 277,500 cubic foot. About fifty mechanics and laborers are usually employed about the premises, although at times the number is much increased.”³³ It may not have seemed like life, but the continuous energy needs of these systems of gas bound slaves and masters into service every bit as surely as a horse’s need to eat bound its riders to seek out grass.³⁴

All life is an expression of power relations, of the ability to command work and energy in the world.³⁵ And this most certainly applied to gasworks. Exactly what kind of life it was—carbon-based, organic, aerobic—is difficult to answer and not really the point. What is important is understanding the processes and power relations sustaining and dependent on the continual transformation of coal into gas into flame. These were not confined to the gasworks themselves, or even the city, any more than the story of eating bread could be said to begin at the bakery. No, our search for the political ecology of gaslight must begin in the dark, in the carbon dungeons that gave coal and life to industrial fires like the one made to enslave some, enrich others, and illuminate many in antebellum New Orleans. If we follow only the paper lights, as too many historians seem to have done, we risk not only ignoring the very unequal spatial politics of light in the city, we allow the high priests of the machine to blind us to its actual origins, the kind of

³³ “A Glance at the Gas Works,” *The Daily Picayune*, April 4, 1850, 2.

³⁴ Elliot West, *The Contested Plains: Indian’s, Goldseekers, and the Rush to Colorado* (Lawrence, Kan.: University of Kansas, 1998).

³⁵ Richard White, *The Organic Machine: The Remaking of the Columbia River* (New York: Hill & Wang, 1995).

reifying veil behind which periodically flashed the violent premature birth of gas dragons in their subterranean nurseries.

The Spatial Politics of Industrial Dungeons: Work, Race, Slave Life Insurance, and Subterranean Fires in the Richmond Coal Mines

*It's dark as a dungeon and damp as the dew,
Where danger is double and pleasures are few,
Where the rain never falls and the sun never shines
It's dark as a dungeon way down in the mine.*³⁶

Samuel Gouldin began his last day alive with a premonition. In the darkness before dawn, he told his wife he had dreamed his death and gave instructions in the event he did not return from the mine. He was so worried that before reaching the coal pits, Gouldin turned back to the house “three times to kiss his little children and bid them good bye.”³⁷ An overseer, Gouldin would have been in the mines by six in the morning, the first light of the sun just creeping over the horizon while he worked underground in the glow of his Davy safety lamp. Raising the odd-looking, wire mesh-wrapped lamp to the ceiling in various parts of the mine, Gouldin would have looked for any sign that the shielded flame was flaring or changing color. He was looking for methane gas, or firedamp as the miners called it. If he found signs of any firedamp, he was supposed to mark off that section of the mine as a warning to any who might pass nearby. For even if the miners all carried safety lamps (which they did not) instead of the open-flame oil-wick cap lamps that were standard in antebellum American coal mines, the mesh was not a perfect protection, and any contact between flame and firedamp could lead to a catastrophic explosion.³⁸

There is no way of knowing for sure if Samuel Gouldin, or any of the other overseers did find any gas, but if they did, it was either ignored or unreported. Whatever the case, the day

³⁶ Merle Travis, “Dark as a Dungeon,” recorded August 8, 1946, Hollywood, California.

³⁷ “Terrible Coal Pit Explosion,” *Daily Dispatch* (Richmond, Va.), March 21, 1855, 2.

³⁸ “The Recent Explosion at the Coal Pits,” *Daily Dispatch*, May 25, 1854, 4.

began as usual at the Midlothian coal pits. Starting at six in the morning the mixed crew of around 150 white and enslaved laborers climbed, one group after another, into two tubs, one “suspended by ropes over pulleys and frame-work, above a yawning abyss seven hundred and seventy-five feet deep,” and the other hanging above a shaft of “only” 625 feet.³⁹ Engines slowly lowered the buckets of men into the deep darkness, who, several minutes later hit the shaft bottoms, oil-wick lamps hooked onto their caps, shedding the faint light that made the work of mining possible.⁴⁰ As was typical in Virginia mines, they were likely burning New Bedford whale oil from right or bowhead whales. Behind every gaslight, then, was not only a miner to hack and haul coal, but a whaler to light his way.⁴¹ To get some idea of how much was spent, of how much energy was put into illumination, a neighboring mine, with less than a quarter the labor force of the Midlothian, consumed over a year in which it raised around fifty thousand bushels of coal, over four hundred gallons of whale lamp oil, thirty pounds of wick, and dozens of lamps at a cost of nearly \$250.⁴² These living lights, these dim companions of flame, wick, tin, and oil guided men through the uneven terrain and dangerous labors of the mines, protecting fingers from smashing, ankles from twisting, and minds from madness. In the Midlothian pits, however, that precious light could be even more dangerous than darkness.

Everywhere the miners and their flames turned—walls, floors, and ceilings—they were surrounded by coal, and coal, of course, was a flammable source of considerable heat. The coal itself, however, was not much of a danger—the lamp flames were far too weak to ignite any but the driest wood, let alone coal. Rather, it was the coal’s deadly breath that miners feared most.

³⁹ Henry Howe, *Historical Collections of Virginia* (Charleston, S.C.: Babcock & Co., 1845), 230.

⁴⁰ Henry A. Pohs, *The Miner’s Flame Light Book: The Story of Man’s Development of Underground Light* (Denver: Flame Publishing Company, 1995), 215-254.

⁴¹ See Chapter 1, “Dragged Up Hither from the Bottom of the Sea.”

⁴² “Account Book, 1841-1843,” Jeremiah T. Jones Papers, Rubenstein Library, Duke University.

Miners called the flammable gases that seeped out of all coal, but especially bituminous coal like that of Virginia, firedamp. The deeper the mine, the more difficult the ventilation, the greater the accumulation of firedamp, and there were no mines in the antebellum United States deeper or (fire) damper than those of Chesterfield county. Yet it was this very breath that made Midlothian coal so valuable to gas engineers like Caldwell. Some coals, like the anthracite of eastern Pennsylvania produced mostly heat and carbon dioxide when burned, while others, like the bituminous of Pittsburg and Chesterfield could be broken down under great heat into hydrogen, methane, and coke (coke is to coal basically what charcoal is to wood). As a rule, the gassier the coal, the gassier the mine, and also the more illuminating gas could be produced from it. In other words, colliers tried to extract as much coal as they could without being breathed on, while gas engineers wanted to make that coal hyperventilate in gasworks. The social lives of gaslights emerged perilously through miners' (usually successful) attempts to control, capture, and avoid coal breath, while engineers accelerated, and ignited those exhalations. But sometimes that gas burst devastatingly into flame in the mines. The attempts to control when, where, and how coal turned into gas and that gas turned into light and flame formed the dangerous, oppressive, and productive chains of gas transforming human life and labor in mines and gasworks into light, money, and social power.

For the next six hours after Samuel Gouldin went to work, men, mules, and lamps trekked through the corridors of the mines, drilling, hacking, blasting, shoveling, and hauling coal back to the base of the shaft. Normally this would go on for hours yet. But by noon on that day, the force of around one hundred free white colliers—having finished removing their daily quota of coal from the mine—had followed their haul to the surface by retracing their descent into the mines. This time, as the men gripped and balanced to remain in the wooden buckets rising towards the noon sky, their journey became more, rather than less dangerous over time. On their

way down, every moment had brought the ground closer, but in exiting the mine, the longer their already tired muscles strained to hold their bodies in the bucket, the farther the miners had to fall should they slip or be struck by a piece of coal plummeting from a bucket swinging above. The passage into and out of the mines was one of the deadliest moments of mining.⁴³

Not everyone left the pits, however, and other passages could be even more treacherous. Forty enslaved black men, most belonging to the Midlothian Coal Mining Company or one of the company owners, remained underground accompanied by the overseer Samuel Gouldin and nine other white workers, three of whom were no older than fourteen.⁴⁴ Several hours later, having repaired timbers, cleared passages, and fed, watered, and reshod the five mules that were permanently stabled underground, Gouldin directed the slaves in boring holes into the wall of one section of the mine. With hand drills, the men cut into the soft coal, packed gunpowder into the openings, arranged the blasting paper, and then waited for the order to fire. These were old mines, the oldest in the country, and the Virginia coal fields were littered with miles and miles of unmapped, abandoned, and flooded tunnels. Some had been worked from before the Revolution, others were more recent. Gouldin and the slaves were preparing to blast open a connection to one of these abandoned pits. Based on the feel of the rock, the sound of the striking picks, and knowledge of the underground environment built up through years of work, tales, and experience, the men were prepared for water to coming rushing out from behind the wall. Unfortunately, they were dead wrong.

The instant “the blast was fired, and the fissure made in the wall between the two chambers,” wrote the *Richmond Enquirer*, “the explosion followed, and the awful destruction of life

⁴³ Louis Simonin, *Underground Life; or Mines and Miners*, trans. and ed., H.W. Bristow (London: Chapman & Hall, 1869), 204-229.

⁴⁴ “Terrible Coal Pit Explosion,” *Daily Dispatch*, March 21, 1855, 2.

which we record took place.”⁴⁵ For it was not water lurking in the old ruins, but a sleeping body of firedamp, waiting to be reborn in flame. As soon as the partition wall was breached by the powder blast, an enormous volume of gas rushed out, engulfing the nearby miners and their cap lamps, and burst into a torrent of fire that “swept as a besom of destruction through the various avenues, dealing death with an unsparing hand, on all that came within its course.” The teams sent in later to attempt a rescue found that the men had died as they worked, “the flesh charred on their bones,” as some “held their shovels in their hands, others were holding to their picks and drills.” Alfred and Archer, two slaves owned by A.S. Wooldridge, the president and chief shareholder of the Midlothian Company, were buried under “several tons of stone and dirt” thrown down upon their bodies as the inferno tore through the mine. Those that escaped death in the pyrrhic birth of this gas dragon were then faced with drowning in its toxic corpse, as “there can be very little doubt that many” of the thirty-four later found dead “were suffocated by the ‘after damp,’ [(carbon monoxide)] rather than killed by the explosion.”⁴⁶

As the explosion overflowed the underground space, the wooden shaft heads were blown off “as if they had been paper,” and at the western shaft, the two cable chains making any entrance or exit into the pits possible “were broken in two as easily as if they had been pipe stems.” Indeed, so tremendous was the force of the firedamp combusting to life that it “caused the earth, for miles around the pits, to wave and rock as a twig in the wind.” A mile away a man crossing the railroad reported feeling “the rails reel under him,” while another traveler “passing the road on horse back, declared that his beast staggered and trembled, as if suddenly shocked by a tremendous galvanic battery.” The slave carpenters working above the eastern shaft were so

⁴⁵ “By Yesterday’s Southern Mail: Explosion of the Midlothian Coal Pits—Shocking Loss of Life,” *Alexandria Gazette*, March 22, 1855, 3.

⁴⁶ “Terrible Coal Pit Explosion,” *Daily Dispatch*, March 21, 1855, 2.

startled, that one of them leaped thirty-five feet to the ground, apparently suffering no injury, while the other two held on for dear life until the shockwave ceased.⁴⁷

The shockwave rolled across the landscape and it also rippled through the social relations converging in the pits. Some of the social artifacts thrust into the historical record by this tragic pulse have survived to the present, and provide rare hints of antebellum social relations that otherwise have remained invisible. The most prominent such artifacts are the newspaper accounts of the disaster and its aftermath. The *Richmond Dispatch*'s account was the most widely circulated and also the most revealing. Their initial report, "Terrible Coal Pit Explosion—Thirty-four Persons Killed, and Twelve others so Badly Burned that but few of them can Recover," began with a restating of the headline, specifying that it occurred at the Midlothian Coal Pits at five o'clock on Monday, two days before. It then immediately pivoted to claims suggesting how unusual and impossible to predict this explosion had been, writing that up "to the very moment of the accident, the superintendents and employees in the pits felt perfectly satisfied that there was not a particle of foul air afloat around them, and Mr. John Atkins, the agent, looked upon the pits as being so entirely free from danger, that he declared to us that he would not have hesitated to take his family into them to remain." Next came a guess as to the cause, some descriptions of the shockwave on the surface, and then a further reminder that the "Midlothian Pits have always been looked upon as free from danger, consequently the company found no difficulty in employing as many steady white miners as they desired."⁴⁸

Indeed, the article's primary purpose seemed to be addressing the concerns of white miners, noting that the toll could have been worse, that "if the explosion had taken place between the hours of 6 and 12 o'clock, we have no hesitation in saying that the loss of life would have

⁴⁷ "Terrible Coal Pit Explosion," *Daily Dispatch*, March 21, 1855, 2.

⁴⁸ "Terrible Coal Pit Explosion," *Daily Dispatch*, March 21, 1855, 2.

been trebled, and the number of widows and orphans thereby created five times as great as that caused by the accident at the English Pits in May last; but fortunately, the men were not allowed to make over work, the supply of coal raised being greater than the demand, consequently, most of the white men had left the pits at 12 o'clock, and thereby saved their lives." Furthermore, the paper made a deliberate attempt to highlight what it saw as a heroic brotherhood of white miners, not just from the Midlothian but from the neighboring English pits that had suffered a similar tragedy the previous year. The article went on to describe how "Mr. Job Atkins, the agent for the English Pits," and presumably a relation of John Atkins, the Midlothian agent, leapt immediately into action, "in company with a number of noble hearted volunteers, descended the Eastern shaft as soon as they could do so, and ... immediately set about in search of such of the miners as they might find alive." Their bravery paid off, because it was not long before they "succeeded in rescuing sixteen persons, more or less burned, four whites and twelve blacks, and took them to their houses and the hospitals, where they were immediately placed under medical treatment." This was the first mention that any black men might have been involved, or even worked in the pits.⁴⁹

The remainder of the account centered on the sensational and graphic sufferings witnessed by and related to the writers. "Mr. Atkins describes the scene as heart rending in the extreme," the article reported. Dozens of dead men lay charred and still clutching their tools, while "Samuel Hunt, a small boy, who had been deprived of reason for the time, by the concussion, was calling loudly to the mule he had been driving to go along." It was likely one of the five mules that perished in the explosion. The other survivors, "as soon as they heard the voices of their friends, begged earnestly not to be left, and then prayed loudly for a few drops of

⁴⁹ "Terrible Coal Pit Explosion," *Daily Dispatch*, March 21, 1855, 2.

cold water to quench their burning thirst.” Yet the true horror, according to the writers, was in the hospitals where some “seven or eight negro men lay there, the skin burned from their faces, eyes, hands, arms and bodies, as if they had been roasted, and the groans that escaped from those who were conscious of their sufferings could not fail to pierce the hardest heart.”⁵⁰

At the end of the article, the writers attached a list of all the dead and injured. Whites were listed first, with names and brief obituaries. Meanwhile “Negroes Burned to Death,” and “Negroes Injured,” mentioned names only, concluding with the observation that a “large number of the above servants were owned by the Midlothian Company, and very few of them were insured.” The damage to the mines, the article noted, was “serious, and it will cost a considerable outlay to get them fairly under way again,” but in the end, the greatest tragedy, and the final remark, was that this “accident has thrown a deep gloom over the neighborhood in which it occurred, and will be the means, no doubt, of driving many persons to seek other employment than that of mining.” Fearing that free white miners would be driven from the mines, first by the English Pits disaster the year before, and now by their near-escape from the Midlothian, the *Dispatch* worried that labor relations in the region might be seriously disrupted.⁵¹ This fear, however, may have been overblown. The details of this tragedy, together with other evidence, show more than a simple market relation between labor and capital. It was no accident that these mines had disproportionately slaughtered black and spared white. The spaces and times of these Virginia coal fields were made and inhabited through a deeply racialized division of labor, life, and danger.

First there was the form of the wage relation between white labor and white capital. Although there is no specific account of how free men in the Midlothian Pits were paid, the

⁵⁰ “Terrible Coal Pit Explosion,” *Daily Dispatch*, March 21, 1855, 2.

⁵¹ “Terrible Coal Pit Explosion,” *Daily Dispatch*, March 21, 1855, 2.

system developed in Britain and continued elsewhere in the United States made it possible the white miners were paid by the ton of coal they raised rather than an hourly wage. According to many studies, this piece rate system was the predominant method of payment in Pennsylvania and Ohio coalfields.⁵² At a neighboring pit owned by the firm of David Watkins & Co, however, account books show that payment was recorded according to days (or fractions of days) worked each month. Because many of the white miners in the nearby pit were also employed at the Midlothian pits, it is likely that they were paid by the “day” in both mines.⁵³

This was more than a minor matter. How the colliers were paid (or not) had an enormous impact on how they worked in the pits. When paid simply for the production of a ton of coal, any time or labor—such as reinforcing timbers, testing for gas, or making sure all the ventilation doors were properly maintained, what miners aptly called “dead work”—spent on anything other than directly getting coal was a garnish off their wages, was free labor for the pit owners. That mine operators could depend on colliers’ interests in staying alive meant that the dangerous environment of the mines would probably coerce some free dead work out of miners paid by quota. But it was notoriously insufficient, and operators and newspapers repeatedly blamed accidents in coal mines on corner-cutting miners (the owners and the payment system that encouraged such corner cutting were rarely so pilloried).⁵⁴

Whatever the precise arrangement in the Chesterfield mines, when around one hundred white miners left the Midlothian pits at noon that day, forty black slaves remained behind. They remained to do the work that free miners would not willingly do, to prepare, sustain, and extend

⁵² Priscilla Long, *Where the Sun Never Shines: A History of America’s Bloody Coal Industry* (New York: Paragon House, 1989), 38.

⁵³ “Account Book, 1841-1843,” Jeremiah T. Jones Papers, Rubenstein Library, Duke University. In practice, however, this may have meant they were paid for a day’s worth of coal.

⁵⁴ Long, *Where the Sun Never Shines*, 38; Branden C. Adams, “Dark as a Dungeon: Work Inside Nineteenth-Century Coal Mines” (senior thesis, Harvard University, 2011).

the spaces of the mines themselves. Had there been no explosion, it might have been at least two in the morning before the slaves finished propping the arches, preparing the timbers for the next day, boring and blasting new chambers, and caring for the mules.⁵⁵ In other words, Gouldin, at the direction of the superintendent John Atkins, kept the slaves underground for hours to shoulder the risks and smooth the way for white miners to spend as little time possible in the pits getting the most coal out at the least risk the following day. Their lives were risked for dead work.

White workers and owners both benefitted from this division of labor in space and time. The miners benefitted by displacing some of the dangers of mining onto black slaves, and then expropriating the slave labor that exposed and loosened the coal that they were paid to accumulate. And because this expropriation allowed white miners to produce more coal more quickly, mine owners, who paid by the day, were able to limit the total size of the industry's free labor force and the wage costs of that more expensive white labor. Many white miners' names listed in the Watkins account books as working full, half, or quarter days, also appeared in articles documenting disasters at the Midlothian pits and the Black Heath pits (the two major collieries). This strongly suggests that these free colliers ranged over the Richmond coal basin as a class, quickly expropriating the labor of enslaved miners before moving on to the next "safe" mine.⁵⁶ As mentioned earlier, the *Richmond Dispatch* made a considerable effort to remind its readers that the Midlothian pits had been considered safe, and that "consequently the company found no difficulty in employing as many steady white miners as they desired."⁵⁷ Free white miners followed stories of safe mines, but this was not merely a natural attribute of the Midlothian Pits. This was a "safety" produced through coercing slaves into dangerous mine spaces and times.

⁵⁵ "Terrible Accident at the Midlothian Coal Pits in Chesterfield—Eleven Lives Lost," *Daily Dispatch*, December 13, 1856, 1.

⁵⁶ "Account Book, 1841-1843," Jones Papers.

⁵⁷ "Terrible Coal Pit Explosion," *Daily Dispatch*, March 21, 1855, 2.

And it was through this coercion, this production of white safety that a firedamp explosion was so violently and devastatingly sparked that evening in the close dark dungeon of the Midlothian Coal Pits.



Fig. 69.—Explosion of Fire-damp.

Figure 3.2. “Explosion of Fire-damp.” Louis Simonin, *Underground Life; or, Mines and Miners* (London, 1869), Fig. 69.

The story did not end with the brief, terrible life and death of an underground gas explosion, however. The social relations keeping slaves chained in and to coal dungeons were anchored far as well as near, sinking propertyed hooks into their very mortality, hooks extending all the way to life insurance offices in New York and Philadelphia. White miners were not the only ones concerned with displacing the persistent risks of coal mining. The Virginia planters who supplied the coal mines with a significant portion of the enslaved labor force were often reluctant to hire out their slaves to such a notoriously dangerous industry, even when the mine owners were willing to pay higher rates. Coal companies like the Midlothian wanted to create strong and dependable spatial relations enabling planters and pit operators to easily move (and work) enslaved bodies from field to mine. Overcoming the social relations holding slaves within

plantations presented a continual challenge to pit operators, one that was at least partially resolved through the institution of life insurance.

The Midlothian Company, judging from research done by Nancy Frantel, directly owned anywhere between 140 and 187 slaves over the antebellum decades.⁵⁸ As the most heavily capitalized mining corporation in the Richmond coal basin, the Midlothian was able to accumulate a reliable workforce of slaves, employing many in its own mines, while hiring out the remainder to work in other Chesterfield pits. Yet even in the Midlothian pits, it was far from this straightforward. As the records produced in the aftermath of the 1855 explosion readily attest, of the 150 men at work underground that day, around 110 were free white workers, 18 were slaves owned directly by the company, 8 were slaves owned by the Wooldridge family (the company proprietors), and 16 were slaves owned by others. Of those sixteen, six were owned by Nicholas Mills, who owned or had stakes in many of the coal mines in the area. The slaves owned by mining interests seem not to have been insured, purchased as part of corporate capitalization.⁵⁹ The corporately owned slaves, however, could not meet the total regional labor demands, and so to persuade planters to hire out their slaves to work in the pits, boosters began peddling the powerful temporal technology of life insurance.

Life insurance provided slaveholders with a tool of mastery that not only forced slaves into underground danger, but could turn both their living labor and their working deaths to account. Indeed, in the mines, even ghosts might not be free. Jordan and John were at the pits that fateful day because their owner, William Goode had rented out the use of their bodies to the Midlothian company. Depending on the terms and duration of hire, Midlothian agents may have paid anywhere from \$1.20 a day to \$90 for six months in order to assert those rights, to be able

⁵⁸ Frantel, *Chesterfield County Virginia Uncovered*, 7, and Appendix Seven.

⁵⁹ "Latest from the Midlothian Pits," *Daily Dispatch*, March 22, 1855, 2.

to command and appropriate the products of Jordan's and John's labor.⁶⁰ But this was not the only reason Jordan and John were underground that day. William Goode had purchased life insurance policies on the two of them through the United States Life Insurance company, a Philadelphia-based corporation with an office in Richmond, apparently contracting with local planters through the Valley Insurance Company.⁶¹

In pooling capital and risk through an Atlantic insurance network, Goode further transformed the nature of his claim over John and Jordan. Now, not only could Goode sell and hire out John and Jordan in life, he could recover all or some of their exchange value (their market prices) in death. Through life insurance, slave owners and insurance agents conspired to create, reinforce, and socialize fictive slaves bearing perfectly stable futures. Moreover, these knowable, ownable, shared futures became, to a certain extent, unmoored from the living bodies upon which they were based. Slaves never owned their own lives, but in certain circumstances they could use their status as property to encourage owners (or hirers) to realize they had a moneyed interest in keeping them alive. And so slaves could sometimes use their chains to carefully shape and guide when, how, and where they worked and lived.⁶² This limited, but meaningful means of survival and control, however, was sharply circumscribed by the necromancy of life insurance. As death (or at least certain kinds of death) no longer prevented owners from realizing their slaves' values, those safe, insured fictive futures pressed dangerously on slaves' real, lived presents. Under many circumstances, the combination of such social

⁶⁰ These figures based on analysis of the account books for 1841-1843 at nearby pits operated by David Watkins & Co, found in "Account Book, 1841-1843," Jones Papers.

⁶¹ "Latest from the Midlothian Pits," *Daily Dispatch*, March 22, 1855, 2; "The Midlothian Explosion," *Alexandria Gazette*, March 24, 1855, 3.

⁶² See Johnson, *Soul by Soul*.

technologies with the working nature of the coal pits made slaves much more attractive than wage workers. The future weighed heavily in the mines.

Indeed, a multiplicity of futures had converged to press John, Jordan, and thirty-eight other slaves into the mines at the moment of the explosion. When the force of forty slaves that Gouldin kept laboring in the Midlothian pits to secure future safe and speedy passage for white miners triggered that catastrophic fiery assault, their own futures, or at least the parts of their futures to which others claimed ownership, were violently decoupled from their bodies. Those few who did survive their horrific burns found their mortality and slavery rejoined, but for eight of those killed in the explosion, the futures imagined for them by white owners and insurers were not permitted to perish along with their bodies. Their undead futures remained the property of planters and miners. And in this case, these were futures stored and coordinated entirely through the United States Life Insurance Company. Of the thirty-three slaves killed in the explosion, twelve were owned by the Midlothian Coal Mining Company, and were uninsured. Corporately owned slaves may have lacked, or been denied insurance policies, but of the twenty-one remaining personal slaves, including John and Jordan Goode, and Stephen, Robert, and Orange who belonged to the Midlothian-owning Wooldridge family, over a third were insured, and each through the United States Life Insurance office.⁶³

As reported in the Virginia papers following the explosion, the “United States Life Insurance Office, under the Exchange Hotel (at the office of the Valley Insurance Company) loses by this accident an insurance on eight servants. The Agent, we see it stated in the Dispatch, is prepared to pay the insurance the moment the claimants make application.” This was, they acknowledged, “comfortable” to slaveholders, and as for the losses to the insurance company,

⁶³ “Latest from the Midlothian Pits,” *Daily Dispatch*, March 22, 1855, 2; “The Midlothian Explosion,” *Alexandria Gazette*, March 24, 1855, 3.

those “who insure lives, however, do it we presume with no expectation that insurance will save life.”⁶⁴ Indeed, saving life was never the point. Rather, life insurance displaced all the risks of death onto the slaves themselves and the companies holding, disseminating, and chopping up ownership of the policies.⁶⁵ While John and Jordan lost their lives, William Goode and the Midlothian company were both absolved of any kind of responsibility. In this way, life insurance loosened the social relations keeping slaves “safely” close to owners, allowing planters, entrepreneurs, and capitalists to more easily shuffle such “liberated” slaves across and under southern landscapes, amplifying their exploitation, and multiplying their productivity at little risk to social and economic relations among southern elites. It was a class-making institution. It was a coal-producing institution.⁶⁶

By insuring enslaved miners, planter and industrial elites further consolidated and protected the wealth appropriated from slaves while wedging open space underground for white working-class miners to more profitably and safely pursue their trade. And this was a fact eminently apparent to Abraham S. Wooldridge, the president of the Midlothian Coal Mining Company and regional booster for the coal industry. He made his sentiments publicly known by publishing a letter he wrote in thanks “*To the President and Directors of the United States Life Insurance, Annuity and Trust Co. of Philadelphia.*” “Gentlemen,” the letter began, “I avail myself of this method to express my appreciation and to commend the promptness of your company in the payment of your policies on lives lost in the Midlothian Coal Pits by the late explosion, (through your agent,

⁶⁴ From the *Richmond Enquirer*: “The Midlothian Explosion,” *Alexandria Gazette*, March 24, 1855, 3.

⁶⁵ For more on slave life insurance, see Edward E. Baptist, “Toxic Debt, Liar Loans, Collateralized and Securitized Human Beings, and the Panic of 1837,” in *Capitalism Takes Command: The Social Transformation of Nineteenth-Century America*, eds. Michael Zakim and Gary J. Kornblith (Chicago: University of Chicago Press, 2012), 69-92: 304-308nn.

⁶⁶ Starobin, 71-74; Sharon A. Murphy, “Securing Human Property: Slavery, Life Insurance, and Industrialization in the Upper South,” *Journal of the Early Republic* 25 (Winter 2005): 615-652; Karen K. Ryder, “‘Permanent Property’: Slave Life Insurance in the Antebellum United States” (PhD diss., University of Delaware, 2012).

O. F. Bresee, at office of ‘Valley Ins. Co.’ in this city,) without availing yourselves of the time allowed for settlement or deducting interest.” It was not only an example of good business; it was an act of community building, one that Wooldridge hoped would reinforce the social relations bringing slaves to the mines. “I can assure you,” he concluded suggestively, “that such liberality will be appreciated by our citizens, and your Company will receive the encouragement and support by our community which it is pre-eminently entitled to, as well for its readiness to pay as its ability to do so.”⁶⁷ This letter, however, was more than a public relations stunt. Read in context, it was also clearly a recruitment notice. Only a few days earlier, the Midlothian Pits had finally reopened, the damage wrought by the explosion having taken three weeks to repair, and Wooldridge needed to refill it with bodies.⁶⁸

Of course, United States Life Insurance was not the only life insurer involved in decoupling enslaved miners’ exchange value from their living selves. As Nancy Frantel’s compilation of records from the Baltimore Life Insurance Company reveals, the credit and capital networks insuring slaves’ fictive futures were vast in scope. A letter from the Baltimore company’s records written in January 1855, a few months before the Midlothian explosion, exploring what rates the company should charge for insuring slaves in coal pits, made reference to three other companies: “The Richmond Fire Association,” the “National Safety Life Insurance and Trust Company” out of Philadelphia, and the “National Loan Fund Life Assurance Company, of London.”⁶⁹ Richmond, Baltimore, Philadelphia, London: these insured futures were examples of complex spatial relations across scales, of the macro shaping the local,

⁶⁷ “State and City News.: Life Insurance,” *Richmond Whig*, April 17, 1855, 2.

⁶⁸ “Virginia: Midlothian Pits,” *Daily Dispatch*, April 11, 1855, 1.

⁶⁹ Thomas Pollard to Mr. Henry F. Thompson Sec. Balt. Life Insur. Co, Richmond: January 11, 1855, quoted in Frantel, *Chesterfield County Virginia Uncovered*, 175-6.

of specific slaves pressed into specific gassy dungeons by futures built upon capital foundations stretching across the Atlantic capitalist world.

These Atlantic foundations were made in the offices of metropolises and they were made through local knowledge, as this letter to the secretary of the Baltimore Life Insurance Company demonstrated. “Mr. Nicholas Mills of this city,” wrote Thomas Pollard from his hometown of Richmond, “has hired some 15 or 20 hands in the Midlothian pits for a number of years & has lost none from accidents.” On the other hand, in “the Black Heath pits near Richmond, a number of accidents have occurred from gas,” and so Pollard cautioned that “at present advice I would not recommend insurance on hands in” the Black Heath mines “at any premium.” Thus Pollard was helping the Baltimore Life Insurance Company and other insurers to assemble history, death, and rumor into guiderails directing slaves, risk, and labor into the Midlothian, and away from the notoriously deadly Black Heath pits. In general, however, Pollard believed coal mines and the slaves in them were eminently worth insuring, writing, “I have thought for a long time that coal pits are more healthy places for negroes than factories or R. Roads,” adding that “I would suggest you should not charge more than $\frac{1}{4}$ per cent Extra premium on coal pit hands. Insurance on negroes can only be made profitable by insuring a large number.” If the Baltimore insurer could stay competitive with other Atlantic firms, Pollard even suggested that “We hope to get some insurance now on white persons,” feeling that if “we can once commence on this Species of insurance we should hope to do well with it.”⁷⁰ Although it had not been tried before, Pollard felt there was money to be made (by insurers and mine owners) in lessening the fears keeping white husbands from risking their lives and families’ futures by working underground. This reticence, after all, was certainly obvious enough in the case of slaves, as the “parties who

⁷⁰ Thomas Pollard to Mr. Henry F. Thompson Sec. Balt. Life Insur. Co, Richmond: January 11, 1855.

apply for insurance of the Coal Pit Hands are very anxious to get the Policies as they are keeping the hands above ground and idle till they get them insured.”⁷¹

“Muzzled to the Dragon”: “Safety” Lamps and the Violence of Seeing

*The explosion of hydrogen in a coal-mine, he calls the ferocious rage of a fiery dragon—the safety-lamp a muzzle to the dragon, which too often leads the miner to his destruction, as it induces him to work where the hydrogen has accumulated.*⁷²

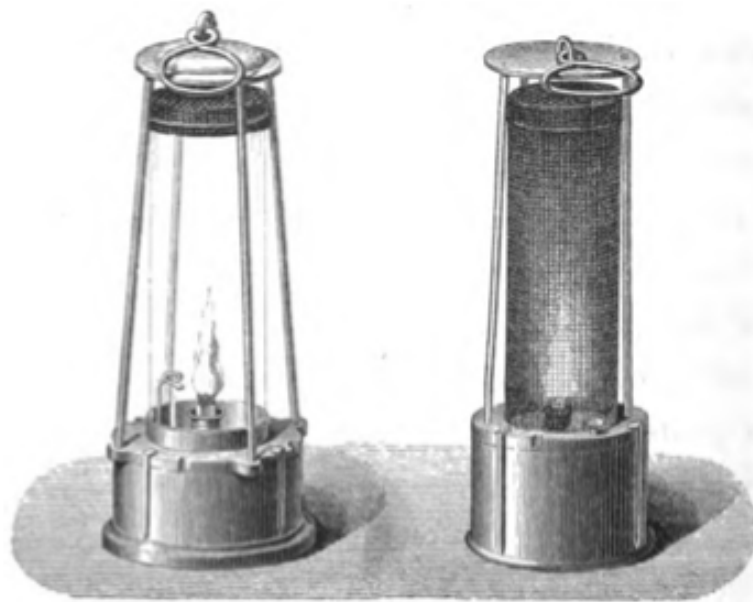
It had happened before. It would happen again. Coal mines had always been dangerous, but explosions like the one that rocked the Midlothian pits in 1855 did not just happen; they were not some natural phenomena inherent to mining. Such unwanted subterranean coal-gas fires were sparked by historically contingent frictions among the social relations, natures, and work practices of specific mines. They had to be cultivated, coaxed, and painstakingly sheltered. First, only the deepest mines could accumulate enough gas and ventilate so poorly that firedamp would explode rather than just burn away. In the antebellum United States, only the Chesterfield pits regularly reached such perilous depths. Second, a very specific array of technologies was necessary to smuggle working bodies and lights to and from such deep seams.

It has been frequently noted that the invention of the steam engine made possible the industrial revolution by both providing a new coal-powered motive force and by enabling coal mines to extend deeper than had ever been possible by pumping the depths dry. Steam engines thus produced power and fuel at once. Less appreciated in this new revolutionary relationship with nature was the role played by another technology: the Davy Safety Lamp. For no matter how dry the new steam pumps kept the deepening mines, without a new kind of light, the lurking firedamp would make the pits either infernal slaughterhouses or just empty holes in the earth.

⁷¹ P B Price to A.B. Coulter, Richmond, 5 February 1857, quoted in Frantel, *Chesterfield County Virginia Uncovered*, 178.

⁷² “Important Discovery,” *New Monthly Magazine* 3 (October 1, 1821): 516.

Davy lamps were invented in Britain in 1815 at around the same time that steam engines were accelerating the demand and possibilities of mining coal. They worked by using a wire mesh cylinder to prevent the flame inside from communicating to the firedamp outside. At a time of crisis in the collieries, when increasingly common and deadly explosions were rubbing up against growing demand, Sir Humphrey Davy discovered that by isolating a lamp flame with a wire gauze chimney, the burning gas would be so cooled by passing over the metal that it would not ignite any firedamp outside the lamp.⁷³ The wire mesh was like a selective membrane that enclosed the metabolic processes of oil, wick, and flame, while allowing some light to escape. Safety lamps thus divided space and energy such that men, mules, and coal—hacking, blasting, and light—could more easily circulate through gassy mines.



Figs. 72, 73.—English Safety-lamps.

Figure 3.3. Safety lamps. Louis Simonin, *Underground Life; or, Mines and Miners* (London, 1869), Figs. 72, 73.

It was supposed to protect. It was supposed to save lives. The “safety lamp” was to bring the scientific chemistry of the Enlightenment to the wretched, primitive coal mines of the

⁷³ Pohs, *Mine Lights*, 279-293.

industrial age. These lamps became wildly popular among coal mine operators in the first half of the nineteenth century, and were considered as necessary to a properly working mine as were steam-driven pumps and an adequate ventilation system. But for all their fanfare, Davy lamps did not actually make coal mines any safer. Understanding how these safety lamps were employed to endanger miners (whether deliberately or not) is to understand the relationships of space, danger, light, and “modern” civilization in new and important ways. I mean this quite literally. Life and labor in coal mines—and therefore the steam engines, rails, and gaslights so often celebrated as materially marking the birth of the modern age—hung tenuously on threads of artificial light. And while this precarious gathering of labor, light, and explosives was earliest and most strikingly obvious in flame-lit coal mines, the deadly spatial regime could be found multiplying in turpentine stills, cotton mills, gasworks, and anywhere a camphene lamp was burning. This was an industrial revolution built over a powder keg and illuminated by the light of a fuse.

The real purpose of these “safety” lamps was to amplify and extend mining space into methane-rich drifts and chambers. They were space-making tools like steam pumps, no more employed to altruistically save lives than steam pumps were used to keep miners warm and dry. For the mine operators, the point was to move coal out of the ground as efficiently and regularly as possible, and the contradictions between this process of accumulation and the safety of the workers erupted periodically into crisis, into the brief horrible lives of underground gas fires. Moreover, the subterranean fires of the Richmond coal field, the oldest in America, traced their origins back at least a generation before the Midlothian birth of 1855, when shaft depth, pumps, lamps, and social power combined to create fertile caverns for explosive life.

In 1839, Wooldridge’s capitalized, incorporated dreams of coal were finally about to be realized, but perhaps not in the way he had imagined. As Midlothian slaves neared completing

the sinking of the first two workable shafts to the coal seam some eight hundred feet below ground, a violent explosion suddenly upset the balance of power in the Richmond coalfields. Shattered timbers shot out of the shaft scattering over one hundred yards, but it was not only wood. Three men in the midst of descending the shaft “were blown up in a coal hamper, to a height of some thirty or forty feet above its top.” Clinging for dear life, “two of them fell out of the hamper in different directions, and were immediately killed—the third remained in it, and fell with it, escaping most miraculously with his life, having both legs broken.”⁷⁴ Underground, early reports were that “some of the Coal bank has been thrown down, and may cover some of the miserable victims—but that the great columns of rock and the walls have not been materially injured.”⁷⁵ The coal, then, was not entirely lost, but of the forty-two men entombed by the blast only four were rescued, and one later died.⁷⁶

It was a Monday in March, as it would be sixteen years and one day later. Two white superintendents kept forty slaves at work underground, almost identical to the situation in 1855. But the explosion was in the Black Heath pits, not the Midlothian, and it erupted in the morning, rather than evening. “How it happened there is no telling,” reported the *Richmond Compiler*, but such ignorance did not dissuade them from declaring “that it occurred from neglect or disregard of positive orders and regulations of the pit, is beyond all doubt.” After all, they simply knew the “drifts and ‘*air coasts*,’ (passages for the air from chamber to chamber) were so arranged as to keep up constant ventillation.” Therefore, the only possibility was that “one of the doors of the *air coasts* must have been closed,” that carelessness or ignorance was to blame, “and that thus the ‘Inflammable gas’ accumulated on Sunday to such an extent as to produce the explosion soon

⁷⁴ “The Black Heath Coal Mine,” *Richmond Enquirer*, March 23, 1839.

⁷⁵ “The Disastrous Accident,” *Richmond Enquirer*, March 21, 1839, 3.

⁷⁶ “The Explosion at the Black Heath Pits,” *Alexandria Gazette*, March 22, 1839, 3.

after the laborers entered the Pit” at six o’clock on that Monday morning. While workers and owners had observed a day of rest on Sunday, the firedamp had been busy.⁷⁷

Nevertheless, in theory, the safety lamps should have saved them. “Sir Humphrey Davy’s safety lamp was regularly used in the mine, and no doubt is entertained but that it was used on Monday morning,” wrote the *Compiler*. But like all technologies, even those designed to protect life, safety lamps could and did easily get out of order, and if even “a slight rent should have been in the wire gauze covering, it would readily ignite the gas.” Moreover, the thin, fragile wire barrier upon which so many lives rested also made for pretty shoddy light, darkening as much as protecting. And so miners invariably carried other lamps, open-flame and bright enough to work by, “and one of these may have been taken into a chamber or drift where the safety lamp had not been presented.” Either rent wire or open-flame “would have involved carelessness,” the article remarked, but “would it not be well, in order to diminish the chances of danger from even *carelessness* itself, to use Davy’s lamp *exclusively*, in all pits where there has been an exhibition of carburetted hydrogen or ‘inflammable gas?’”⁷⁸ Such faith in science was not an uncommon response to explosions, but they seemed to miss a key point. Operators had an interest in the more expensive safety lamps only insofar as they expanded the potential space of the mines. The miners, meanwhile, who were there to work, preferred any other kind of light unless they were convinced their lives depended on them. Neither capital nor labor had an interest in exclusively using Davy lamps.⁷⁹

Still, all worked to avoid and prevent explosions, and mine owners relied on skilled superintendents to coordinate the safe and steady passage of workers, lights, and coal through

⁷⁷ “The Black Heath Coal Mine,” *Richmond Enquirer*, March 23, 1839.

⁷⁸ “The Black Heath Coal Mine,” *Richmond Enquirer*, March 23, 1839.

⁷⁹ For such tensions see: Long, *Where the Sun Never Shines*; and Adams, “Dark as a Dungeon.”

potentially gassy tunnels. In the Richmond basin, more often than not these superintendents were seasoned Scottish or English miners.⁸⁰ The knowledge, skill, and willingness to work underground that these men carried with them from the even deeper, older, and gassier mines of Great Britain put them in high demand in Chesterfield. And it also earned them trust. John Rynard, a “Scotchman,” and one of the two overseers below that Monday morning “was a man of great skill in his profession, having been many years engaged in it in some of the most famous of the English mines.” Considering Rynard’s reputation, then, it was “hard to account for how *he* should have permitted the cause of the occurrence,” reflected the article with some incredulity.⁸¹

These British masters of underground lights did not, however, likely arrive in Richmond with much experience as masters of slaves. Precisely what frictions existed in Virginia among the American whites, British whites, black slaves, and freed blacks working underground is not entirely clear from the historical record, but some clues have survived. As in the later explosion, those shouldering the risk of Monday morning dead work “were all colored men,” and the “superintendents above the shafts say that about forty were below.” Interestingly, however, this was only a guess, the superintendents “cannot speak with certainty.” Apparently, many of the slaves “had gone to see their wives to distant plantations, and it was not known how many had returned. Those who had not, do not yet appear from terror at the news of the explosion, but forty is the *maximum*.”⁸² First, this uncertainty may have been evidence that black miners were considered so interchangeable that no one bothered recording who did what work when. Second, some slaves, it seemed, moved regularly from mine to plantation, carefully negotiating the

⁸⁰ “Account Book, 1841-1843,” Jones Papers; “Manœuvres of the Whigs,” *Richmond Enquirer*, April 12, 1844; and Frederick Law Olmsted, *A Journey in the Seaboard Slave States: With Remarks on their Economy* (New York: Dix & Edwards, 1856), 47-48.

⁸¹ “The Black Heath Coal Mine,” *Richmond Enquirer*, March 23, 1839.

⁸² “The Black Heath Coal Mine,” *Richmond Enquirer*, March 23, 1839.

tangled social forces and spaces making them husbands, miners, and property. No doubt this “freedom” was severely circumscribed, but it may have been enough for some slaves to slip through a regime of interchangeability that, at least after the explosion, left their very lives in question.

Indeed, the explosion cast a cloud of uncertainty over the whole county, threatening to interrupt the vital movement of slaves from plantations to pits. The property of the wealthy and well regarded Heth family, the Black Heath Pits had been mined for generations. By 1839 it was a monument to the Virginia coal industry. Not only was it acknowledged to be “one of the richest and most extensive” mines in the region, the Black Heath was also reputedly “the deepest in the Union: being more than 700 feet to its bottom.”⁸³ But its very success proved its undoing. They had delved too deep, awoken subterranean fire. It would be months before all the rubble and black damp could be cleared, timbers repaired, and the mine made once again useable. And in the meantime, slaves feared to return to the pits, while planters feared to part with them.

It was a crisis, but also an opportunity. Following the disaster, the Black Heath Pits, which had been owned and operated by the Heth family since 1788, were sold to an English-owned corporation, the Chesterfield Coal and Iron Mining Company, and became known subsequently as the “English Coal Pits.” The English response to the crisis was to abandon hiring slaves altogether, instead employing English miners and free blacks.⁸⁴ But most of this was still in the future. In the aftermath of the explosion, the English Pits were only an imagined reality. Right then, they were just dark, toxic holes in the ground. Meanwhile, another vision for the coal fields, a vision of industrial slavery, was beginning to materialize immediately adjacent to the

⁸³ “The Black Heath Coal Mine,” *Richmond Enquirer*, March 23, 1839.

⁸⁴ Ronald L. Lewis, *Black Coal Miners in America: Race, Class, and Community Conflict 1780-1980* (Lexington, Ky.: University Press of Kentucky, 1987), 4-5.

now-closed mine. A.S. Wooldridge, with his heavily capitalized slave labor force and shaft-sinking engines was poised to seize advantage. A few months after the Black Heath disaster, the *Richmond Enquirer* excitedly reported that the Midlothian company had “struck at the distance of 783 feet from the surface of the earth” what appeared to be a bed of “very rich” coal that “would be almost inexhaustible.” More importantly, and more urgently, they had no “doubt Mr. Wooldridge will push this article into market, and thereby supply in some degree the deficit which is occasioned for the time, by the melancholy disaster which lately happened at one of the Pits in the neighborhood.”⁸⁵ Already the Black Heath was being forgotten. This was going to be a Midlothian future.

First, however, Wooldridge would need to rebuild the relations of trust ruptured in the Black Heath explosion. Even the Midlothian, with a permanently owned labor force, needed planters to hire out their slaves to the mines. No sooner had the Midlothian pits struck coal than Wooldridge started circulating notices in the Richmond papers titled, “MID-LOTHIAN NOTICE. PIT HANDS WANTED.” “In consequence of reports having been circulated of the insecurity of hirelings in the Mid-Lothian Mines,” the ads began, “the Company deem it proper to make known, that the mines have recently been opened, and that not the slightest explosion from gas has occurred.” If this absence of destruction was not particularly reassuring, Wooldridge wanted his readers to know that he had the best in the business working to head off any danger. According to the ad, the Midlothian “workings were laid out and are now progressing, under a plan furnished by Messieurs Foster & Hall, two distinguished English Colliers, sent over from England to reclaim the Pits of the Black Heath Company after the recent explosion of gas—and the present under ground operations are now conducted under the management of one of the

⁸⁵ “Deep Coal Pit—Mid Lothian,” *Richmond Enquirer*, September 13, 1839, 2.

English foremen left here by these gentlemen, and supervised by Mr. Wm. Hall.”⁸⁶ It was, perhaps, ironic. The English capital and colliers pouring into a social landscape still reeling from the Black Heath explosion might have established an island of free labor capitalism in slave country. But channeled and redirected by men like Wooldridge, these British migrants promised to stabilize, strengthen, and modernize the very industrial slavery they had thought to replace.

Having entangled English and Virginian capital, men, and expertise to project a safe and secure minescape, the Midlothian owners still needed to make their pitch to planters. “Owners of slaves at a distance from the Coal Mines, would do well to give some attention to the subject,” announced the ad, and “the Company are now in want of some ten or fifteen additional able-bodied, active Pit-hands, on hire by the year, for which they will give the most liberal hire.” Indeed, planters should be eager to get their field hands to the mines, for there “is no place in this country where slave labor commands as much, where their general health is better, and where the treatment and contentment of the slaves are surpassed.” Of course it was true, Wooldridge admitted, “that within the last few years several disastrous accidents have occurred, but from the scientific and practical skill attracted to the mines, these accidents will be of rare occurrence, it is to be hoped.” This ad was a plea for trust. When A.S. Wooldridge signed his name to the publication, and included an additional assurance of safety signed by the “two distinguished English Colliers,” Frank Foster and T.Y. Hall, he was putting his and their reputations on the line. He was trying to build a community with, if not a shared vision, at least a shared interest in the industrial slavery of the coalfields. It was apparently quite a success. By the Civil War, the

⁸⁶ “Mid-Lothian Notice,” *Richmond Enquirer*, January 9, 1840, 3.

two-dozen largest companies in the Richmond-area pits hired or owned nearly two thousand hands, mostly slaves, and they were raising over 100,000 tons of coal each year.⁸⁷

It was, however, something of a Sisyphean task. In 1839, when these ads and booster articles first started circulating, the Midlothian workings had only progressed about eleven feet into the coal seam from the bottom of the eight-hundred foot shaft.⁸⁸ By mid-1842, the work force of around one hundred fifty slaves and a few dozen whites had cut several miles of passages and multiple levels underground.⁸⁹ Lying on their sides, palm-sized lamps illuminating the glittering black rock, men would hack under the coal face, hoping it would not collapse on their aching bodies, then drill holes for a powder charge. Lighting the fuses, the powder would blast the undercut face, collapsing down into loose coal. Men and boys would shovel the loose coal into mule-drawn carts, which would be hauled back to the shaft and then transferred to coal baskets to be lifted up out of the mines. Steam engines were continually at work pumping water out of the deep mines so that it was merely damp and puddle-ridden. A furnace lit at the base of a second shaft used convection to force air to circulate into, through, and out of the mine passages, with carefully placed and monitored wooden doors directing the flow of air from the surface to the workings and back.⁹⁰ Day by day this process was repeated until by June, 1842 Midlothian slaves had removed around a million and a half bushels of coal (sixty thousand tons), much of it destined for gasworks. When it was all working properly, this system was supposed to minimize the risk of explosion or flooding by drawing off gas and water. But in the mines,

⁸⁷ Lewis, *Black Coal Miners in America*, 6; Adams, *Old Dominion, Industrial Commonwealth*, 208.

⁸⁸ "Deep Coal Pit—Mid Lothian," *Richmond Enquirer*, September 13, 1839, 2.

⁸⁹ Henry Howe, *Historical Collections of Virginia* (Charleston, S.C.: Babcock & Co, 1845), 230-232.

⁹⁰ Long, *Where the Sun Never Shines*, 24-51; Louis Simonin, *Underground Life; or, Mines and Miners* (London: Chapman and Hall, 1869), 114-179.

nothing stayed the way it was supposed to for very long, and on June 23, 1842, fire once again brought activity to a grinding halt.⁹¹

It was fortunate for the region's coal interests that by 1842, the English pits were open again. The Midlothian remained completely shuttered for over six weeks, with the hopes that the fire raging below would eventually exhaust itself.⁹² Indeed, so bad was the fire that after they finally opened up the shaft head, it took yet another month to clear away all the gas and wreckage created by the underground inferno.⁹³ But repairing the physical mine was only half the task. After all these months lost, it was time for another round of newspaper publications. Placing "Pit Hands Wanted" ads in Richmond papers and publishing detailed accounts of how the mines were reclaimed, A.S. Wooldridge also invited reporters, ministers, and local ladies to take guided tours of the mines. As accounts of these tours were published, penned, or circulated by word of mouth, Wooldridge hoped to maintain the trust of investors, slaveholders, and free miners.⁹⁴

This pattern of explosions followed rapidly by a sustained public reassurance continued tragically, predictably, in the Chesterfield coalfields through the Civil War. Each time it happened, the newspapers seemed shocked, surprised, and certain that science would put an end to these deadly interruptions in mining. When investigations found that safety lamps may have been improperly used, that men may have unscrewed the tops to light pipes or for better

⁹¹ "National Institute Papers. Account of the Burning of the Midlothian Coal Mines, Chesterfield county, in June, 1842, by A.S. Wooldridge...", *Daily National Intelligencer*, July 28, 1843, 2.

⁹² "Account Book, 1841-1843," Jones Papers. Only about five white miners worked at the Watkins pits before June 1842. After that date the number of white miners seemed to have jumped, especially for July of 1842. It is possible that many of these were miners who would normally have been working at the Midlothian pits.

⁹³ "Account of the Burning of the Midlothian Coal Mines," *Daily National Intelligencer*, July 28, 1843, 2.

⁹⁴ "Pit Hands Wanted," *Richmond Whig*, January 3, 1843, 3; "Account of the Burning of the Midlothian Coal Mines," *Daily National Intelligencer*, July 28, 1843, 2; Howe, *Historical Collections of Virginia*, 230-232; Richmond Compiler, "Visit to a Coal Mine," *Daily National Intelligencer*, November 2, 1843, 2.

illumination so that they could actually see the workplace, company officers proclaimed outrage and innocence.⁹⁵ More than likely, Richmond companies responded by trying to substitute such lamps with newly popular locked models. Not trusting miners or their knowledge of the mines, owners tried to force scientific expertise into work practices by controlling access to flame and light with lock and key. Of course, they were also covering their own hides by making it even easier to place blame for any accident on the workers.⁹⁶ But little actually changed. By the mid-1850s, when another flurry of explosions erupted under the Richmond Basin, the most significant development in the disaster response was the presence of slave life insurance policies stabilizing relations between slaveholding planters and miners. In a sense, this cycle of fire presented a problem without a real solution. So long as cities and factories valued coal, and especially gas-rich coal, there was power and profits to be had by convincing and coercing men to sneak rock-bound gas out of the dragon's den. Such would never end well. Aboveground, in the gasworks and gaslights of antebellum America, the problems were both similar and different, but the struggle to know, control, contain, and harness inflammable coal gas was every bit as desperate.

Gasworks in the Liberal City

Gas was, with few exceptions, the unquestioned light of an industrially enlightened future. First developed in Britain in the early nineteenth century, by the 1840s European and American cities were enthusiastically adopting the technology. All over the country, from New York, Boston, and Philadelphia, to New Orleans, Baltimore, Richmond, and even whale-crazed New Bedford, gasworks were sprouting up, expanding, and thriving in cities still overwhelmingly illuminated with camphene, oil, and candles.

⁹⁵ "Explosion and Loss of Life at the Black Heath Coal Mines," *Daily Dispatch*, November 28, 1855, 2.

⁹⁶ Pohs, *Mine Lights*, 369-370.

One of the loudest proponents of gas was the New York publication *Scientific American*. For writers in *Scientific American* gas was, or should have been, an agent of democracy, equality, and freedom. Complaining of what they perceived to be unfairly high gas rates in 1852, they argued that if “gas was \$2 per 1000 feet,” instead of \$3, “all our working people would use it, and it would prove a blessing to them. There would be no accidents from camphene, and there would be less fires. Community, in *toto*, would be the gainers.” It was, therefore, the civic “duty of all to exert an influence in bringing about a reform in the gas line.” Nor was this an unreasonable goal, the article noted, for every “mechanic in Manchester and Glasgow has his domicil lighted with cheap, convenient, and clean gas light. Why cannot our people, as a whole, have the same advantages?”⁹⁷ Later that year, having achieved no reduction in the rate, *Scientific American* continued to press their case. “The city of New York,” they wrote, “contains the most patient, suffering population in the world.” Instead of serving as a force for freedom, gas was functioning as mechanism of exploitation for New Yorkers, as their “rulers, every public chartered company, every city contractor, and every speculator favored by these rulers, enjoy the most delectable privilege of getting the greatest amount of money out the ‘dear people.’ The taxes of New York City are much higher than those of any city in the world, and no city is so poorly served.”⁹⁸

The main problem, they felt, was that New York’s gasworks were purchasing overpriced, inferior coal from Liverpool, when it was their “opinion that good cannel coal,” the coal with the highest gas content, could “be obtained from Virginia for as low a price as \$7 or \$6 per ton, and if cannel coal was taken from Glasgow instead of purchasing the inferior Liverpool coal, a great saving in that quarter would be effected.” If this was done, *Scientific American* was confident that the price could be reduced from three to two dollars per thousand feet, and once “reduced in

⁹⁷ “At What Price Gas may be Produced,” *Scientific American* 7 (January 24, 1852): 148.

⁹⁸ “Give us Cheap Gas,” *Scientific American* 8 (December 11, 1852): 101.

price, almost every private family would use it in place of oil, camphene, &c. We hope our gas companies will see to this; it would be the means of preventing many of the casualties which are constantly occurring from the use of volatile hydro-carbon fluids, and be a blessing to both rich and poor.”⁹⁹

Right away, it should be obvious that there were problems in the way arguments for gas were being made in terms of safety, justice, and responsibility, problems quite similar to those plaguing “safety lamps.” This was a consumer politics, one that handily overlooked the social costs, and curses, of coal for producers. Gas would be a “blessing” to all as long as it was cheap, and so *Scientific American* specifically demanded either slave-mined coal from Virginia or that produced with the bonded and child labor of Scottish mines.¹⁰⁰ Part of the issue was that there was no easy way for private citizens to know where the city gasworks got its coal, or how much it paid. Consumers were privy only to the price of gas, the rest of the story hidden behind property rights and the commodity circuits that flattened and obscured the production of coal. It was a socially enforced blindness that encouraged a myopic focus on consumer costs.

But then why ask specifically for the cruelest, most exploitative coals available? It was not as if the advocates of cheap gas were unable to at least imagine the realm of production. During a trial over the use of gas meters to charge customers, the lawyer for the Boston Gas Light Company went so far as to argue “what an incalculable saving [gas] has effected in human and animal life, by dispensing, in part, with the necessity for common oil—an article obtained only at the greatest risk of life, and at a very heavy expense.”¹⁰¹ Because whaling was such a dangerous

⁹⁹ “Give us Cheap Gas,” *Scientific American* 8 (December 11, 1852): 101.

¹⁰⁰ British Commission for inquiring into the Employment and Condition of Children in Mines and Manufactories, *The Condition and Treatment of the Children Employed in the Mines and Collieries of the United Kingdom*, first report (London: William Strange, 1842).

¹⁰¹ Boston Gas Light Company, *Trial. Boston Gas Light Company versus William Gault* (Boston: Eastburn’s Press, 1848), 70.

enterprise, they seemed to be suggesting, Americans should get their light from coal mining! Perhaps it was that Americans associated coal with those foreign British, or because it was not white Americans mining in Virginia, or that there were no coal-mining heroes to match the whalemens of American popular antebellum literature. Whatever the reason, when discussing light, whale oil was readily connected to whaling, while coal was reduced to features of price, chemistry, and geology.

The urban politics through which systems of gas, iron, and flame emerged in antebellum America attached a new set of questions onto light: questions of cost, quality, and public good. Meanwhile, issues of labor, justice, and individual rights were reframed as selfishly irrelevant. In the process, light also became increasingly a problem of government. In 1844, a committee was formed in Boston to investigate gaslight, and came “without difficulty” to the conclusion “that *some* deduction should be made in the price of Gas.” Not everyone in the city agreed, however. As the committee was quick to point out, “an active opposition is now carried on by persons who deal in camphine and various compounds, which can be afforded at half the present price of Gas.” The merchants of piney light wanted to protect their control over the swelling working-class demand for cheap domestic illumination. They wanted government to keep out of the market. The piney lights, however, did not cooperate with their vendors. The deadly and spectacular camphine explosions peppering newspapers across the country provided a moral opening for advocates of gas.¹⁰² “That most persons would prefer Gas to these compounds, there is little doubt,” the committee wrote, and so the real “question then is, what shall that deduction be?”¹⁰³

¹⁰² See Chapter 2, “Piney Lights.”

¹⁰³ City of Boston, *Report of a Committee of the Consumers of Gas, of the City of Boston February, 1844* (Boston: John H. Eastburn, 1844), 4.

The answer many proposed to this question of safety and markets lay in corporations. “The risks of the Company are so great,” proclaimed the report, that “no insurance can be effected against fire, and any accident to a Gasometer would be attended with great expense.” Indeed, if gaslight were to rescue poor women and children from the violence of camphene, the real dangers and risks of gaslight, they argued, would be shifted not to miner or gas worker (or consumer), but to capital. And so the committee was “unanimous in the opinion that an annual dividend, of at least ten per cent, to cover all risks, should be realized by their stockholders, and it is presumed that a liberal public would not consider any thing less, an adequate compensation for so important and extensive an enterprise.”¹⁰⁴ A liberal public, a liberal city required cheap gas, and cheap gas, explained the Boston Gas Company, required “an association, a clubbing together of purses and of minds. That was the way the Western Railroad was built—that was the way the Gas Company was established—that is the way that every heavy manufacture must be undertaken.” In this vision, gas companies were progressive heroes, for the “Gas Companies do cheapen that article of prime necessity—LIGHT—and not only so, but they bring it within the means of poor and humble men, who, but for gas, would be deprived of a large portion of the light they may now enjoy.” Monopoly as a means of democracy and equality may not have sounded fair or beautiful, but it “is a Corporation alone, ‘monster’ though it be, that can give us gas—and however hideous it may appear ... it bears a very benignant aspect to the poor man whose midnight toil is rendered cheerful by its light.”¹⁰⁵

Still, this ascension of liberal monopolies was hardly without friction. Monopolies of light had to be manufactured and tolerated in real space, not just in newspapers, trials, and reports. One of the chief material technologies of liberal lights, and also among the most hotly contested,

¹⁰⁴ *Report of a Committee of the Consumers of Gas*, 7.

¹⁰⁵ *Boston Gas Light Company vs. Wm. Gault*, 71-72.

were the gas meters admitting and measuring the flow of gas into every shop, home, and office served by the gas company. Meters were not something most people were at all familiar with, and they greeted these automatic mechanisms of exchange with considerable skepticism. Meters not only allowed the exchange of gas to be automatic, but replaced a social interaction with one between individuals and things. With automatic meters, customers received the gas they wanted when they unstopped and lit a fixture, while gas company employees visited each meter (located outside the premises) every few months and recorded the quantity of gas consumed. These records were then centralized by company clerks and a bill would be sent to the customer.

None of this involved any human interaction between producers and consumers. For this to work, in order to legitimize these bills, relations of trust between consumer and company would have to be built telescopically. It was a messy process. Gas companies and city governments sought to overcome fears of price-gouging and social distance through science and public trust. “Your Committee are entirely satisfied,” reported the government of Boston in 1844, “that though subject to slight variations, the meter is a measure of Gas sufficiently correct for all practical purposes; and as much to be depended upon as any other measures in ordinary use.” And for those numerous doubting consumers who nonetheless complained that they “have been charged with more Gas then [sic] they could possibly have consumed,” the report asked, “are these complains always well founded?” They admitted that “in so large an establishment combining such a variety of transactions” as a gasworks, that “errors should occasionally be committed is very probable and ... may very reasonably be expected. But are the consumers as careful in this as in their business transactions? do they watch the height of the flame? are they

present at all times? are they sure that the Gas is not improperly and improvidently consumed during their absence?”¹⁰⁶

Still, many remained unconvinced. In the winter of 1847, merchant tailor of Boston William Gault contracted with the Boston Gas Light Company to have gaslight provided to his shop on Washington street. A gas fitter hired by the company began the installation by drawing tin piping from the gas main running under the street into Gault’s tailoring shop. This piping was arranged to run through a gas meter, placed in the cellar under the shop where a company employee could inspect it occasionally. Each evening, Otis Foster, one of Gault’s apprentice cutters, would light up the six gas burners fitted around the store at around half-past four to five o’clock, keeping them lit for six hours before extinguishing the flames at ten to half-past ten. “There were six burners in the store,” Foster later testified, “and I think that they were never all lighted at one time. We sometimes lighted three and sometimes four. We had two in the window, two in the centre, and two at the back of the shop. Sometimes we lighted none at the back end. When business required a light in the cutting room, we lighted a fourth.” Carefully regulating light as people moved and worked through the shop, Foster was responsible for efficiently and economically deploying illumination over processes of labor and exchange. “It was my duty to light and take care of the gas,” Foster explained. Keeping an eye on the adjustable height of the flame in the globe lamps, his “attention was directed to it by Mr. Gault, and I took particular pains to economize, and to see how much gas was used.”¹⁰⁷

After a few months, a bill was sent to Gault for the gas used from October 1, 1847 to January 1, 1848, which the company expected him to pay. Apparently, he had different ideas. Gault believed he had been overcharged, that his meter was suspect, imperfect. And if what the

¹⁰⁶ *Report of a Committee of the Consumers of Gas*, 13-14.

¹⁰⁷ *Boston Gas Light Company vs. Wm. Gault*, 6-18, 37-38.

meter said he owed might not be the case, well then, Gault felt there was no good reason he should have to pay anything at all. He said as much. Understandably, the gas company was not amused.

In the ensuing trial, the company marshaled testimony from gas experts, scientists, meter makers, and the host of employees involved in the making, delivering, and bill collecting for Gault's gas. George Slater took account of the meters in Gault's neighborhood, at a salary of \$12 a week. Slater then transferred his account books to Joseph Stearns, the company clerk who entered the meter accounts for all customers. Henry Davis then delivered a bill to Gault and tried to collect. Charles Brintnall was the bill clerk. Nathaniel Turner was the gas fitter. Richard Hodson was the meter maker, and William Lawler was in charge of proving the meters. Finally, John Blake was the manager of the gasworks, where he superintended upwards of seventy Irish workmen tending dozens of benches, loading scores of retorts with Chesterfield coal, to manufacture the gas delivered to Gault and hundreds of others.¹⁰⁸

Gault's defense attorney, Marshall Chase, on the other hand, paraded an array of small and medium business owners—from theater managers, hatters, jewelers, to machinists—to challenge the notion that the gas company, despite its scientific pretensions, could ever fairly or accurately deliver gas and charge its customers. And this, Chase argued was “a question of immeasurable value to my client, to all consumers of gas in the city, to you, gentlemen, and to the citizens and public in general.” Indeed, the authority and power to charge for gas was not something that many were ready to cede to gas manufacturers. “How must it be then with these paid men—these servants of this Corporation,” Gault's lawyer asked, “How shall they pretend to be umpires or competent judges of the accuracy of a machine like that before you! Any such

¹⁰⁸ *Boston Gas Light Company vs. Wm. Gault.*

pretence is a fable. It is false. It is ridiculous. It is absurd.” And perhaps the most important point, he argued, was that the gas company knew all this. They knew it was a sham, a confidence game. “Why is this the first case” of the company suing a customer? “Not because,” he continued, “like other corporations, they would not wage war with heaven and earth to obtain the last mill due them—but because they do not know what is due them.” This trial, Chase argued, was nothing more than an attempt by gasmen to cloak their unreliable meters in the guise of science, for after all, they “know that their meters are no test, and they throw in their bills when they can’t collect them peaceably, because they know on what a bruised and broken reed they depend.”¹⁰⁹

The company eventually won the trial and then published the proceedings in triumph. But although Gault and similarly aggrieved customers lost, the trial provided a glimpse of a middle class self-consciously organizing itself around gaslight. As small business owners tried to grapple with the problems of metered gas, they formed a faction challenging the authority of monopoly corporations to determine the relations of exchange. Meanwhile, as business owners articulated a middle-class politics around gas meters, small property holders began to organize around a different aspect of the geography of coal gaslight: that of the gasworks and gasholders.

In 1852, the mayor and aldermen of the city of Boston agreed to hear complaints against the Gas Company from propertied residents of the South End, the North End, and the center of the city concerning planned or existing gasholders and retort houses.¹¹⁰ Almost universally, residents claimed that the manufacture and storage of real and imagined gas was physically poisoning their neighborhoods, marring them with soot, and lowering property values. Those close to the gasworks made the additional (for some the principal) claim that the influx of Irish

¹⁰⁹ *Boston Gas Light Company vs. Wm. Gault*, 18-45.

¹¹⁰ City of Boston, *Report on the Erection of a Gasometer in Mason Street*, City Document, no. 39, July 19, 1852; Boston Gas Light Company, *Report of the Hearings before the Board of Mayor and Aldermen, upon the Remonstrances against the South Gasometer, and the Extension of the Works of the Gas Company at the North End* (Boston: Wright & Hasty, 1852).

laborers employed to work the coal yards and retort houses was destroying their communities and threatening the American character of the city. “No Gas manufactory can be established in any way and not be a nuisance,” they complained, noting that in the South End “the population has changed, the American families leaving and the lower class of Irish coming in and taking their places.” Moreover, the gasworks of the Company “must throw out its noxious effluvia and its smoke, and, as we can show, be productive of great danger to the passers-by.”¹¹¹

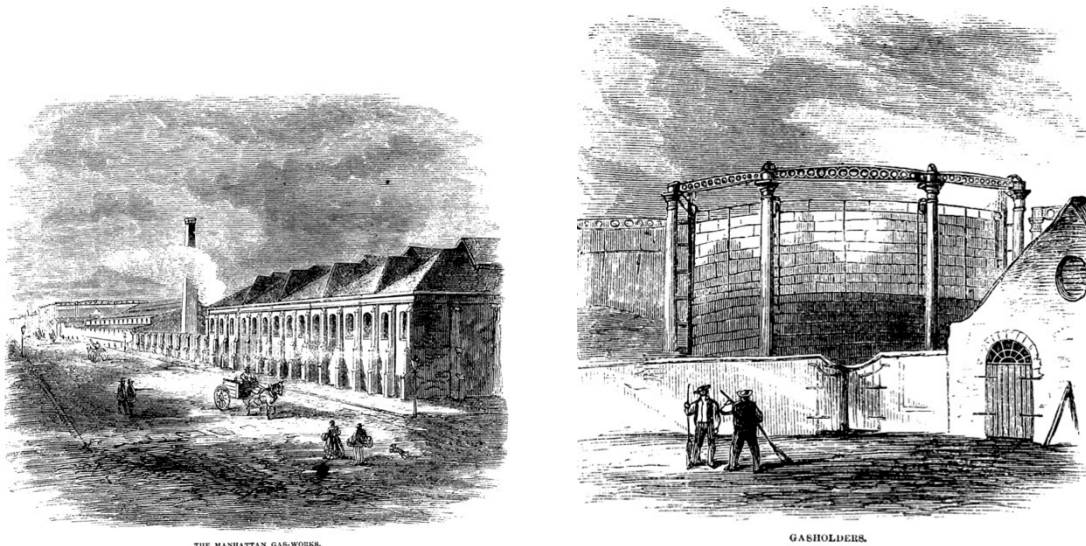


Figure 3.4. Gasworks and gasometers. *Harper's New Monthly Magazine*, December 1862, 14-15.

As before, however, the city government responded to these private complaints by pitting them against a more universal public interest. Not only should a gas corporation be granted special privileges, they argued, but the mechanical and metabolic needs of these systems of gas, iron, and flame should take priority over private property rights—and the biological rights of individual citizens living near the gasworks to not inhale soot, fumes, and poisons—if the gasworks could be made to better and more broadly serve all the people of Boston. To that end, the city clarified, “reservoirs of gas are indispensably necessary, and the interests of the consumers of gas are united with those of the manufacturers, in having those reservoirs at the

¹¹¹ *Remonstrances against the South Gasometer, and the Extension of the Works of the Gas Company at the North End*, 20.

points most suitable for distribution.” A truly liberal, democratically served city, then, would be made by forging and enshrining a relationship between a corporation and the people, unimpeded by the selfishness of individual businessmen or property holders. “It is not therefore with an eye to their interests alone, but with a comprehensive regard to the accommodation of the public,” the report concluded, that there should be “a large and increasing body of persons who depend on the supply of gas for lighting their houses, stores and shops.”¹¹²

Ultimately, however, middle-class petitioners, city officials, and corporation owners had converged on largely common ground. They disagreed about the particulars of exactly when, where, and how gas would be made, delivered, and charged, but all agreed that these systems should be built, that governments should play some regulating role, and some fair terms of measurement and exchange should be established. And significantly, they justified these arrangements in the liberal terms of money, property, efficiency, and safety. But it was not just aboveground and in the marketplace that Boston’s gasworks endangered the citizens whom it was supposedly meant to serve. Nor were the fears of its citizens restricted to the slow degrading of their neighborhoods through industrial waste and the character of workers. At least as acutely, it was the threat of sudden fiery violence that haunted the cities where coal gaslights were made.

On the morning of February 21, 1852, “the clerk in Simon M. Gove’s furnishing store, 8 Hanover street, discovered that the gas in the cellar was escaping rapidly, filling the shop with its odor.” There was little he could do, and to make decisions even more difficult, by the time he noticed the leak, it was likely the gas had already affected his thinking. Hoping to locate and maybe even stop the leak in the cellar, the clerk “immediately descended with a lighted lamp ... when the gas took fire and exploded with a very loud report, completely shattering the large bow

¹¹² *Report on the Erection of a Gasometer in Mason Street*, 11.

window in the front of the store, and to some extent the wood work around it.” Miraculously, the clerk survived as the “cellar was instantly enveloped in flame,” although his “eyebrows were burnt off, also some of his hair, and his face and hands considerably scorched.” Not surprisingly, “the explosion nearly stunned him, besides the danger to which he was exposed from the stifling atmosphere.”¹¹³ Poisoned, burned, but alive, the unnamed clerk was lucky to escape. And as neighbors and fire brigades quickly extinguished the fire without further damage, the store owner and the city’s residents must have counted themselves lucky as well. Nevertheless, the *Daily Evening Transcript* pointedly suggested, the “frequent repetition of similar accidents, which we have to notice, leads to the question whether there is not some dangerous defect in the prevailing mode of introducing gas fixtures into buildings, which ought to be inquired into.”¹¹⁴ The explosion on Hanover street was explicitly cited in the formal petitions made later that year.¹¹⁵

This was, moreover, hardly just an issue in Boston. The unintended and catastrophic sparking of gas fires, which continued to ravage and enforce discipline in the mines, became violently (and spectacularly) entangled in parallel processes of social formation in cities all across the United States. That very same year, a gas main running under the street of a former New York City alderman had exploded, pouring gas into the earth all around it, and filling the ex-alderman’s coal cellar. Shortly after, he decided he wanted some coal brought up, so “he requested the servant girl to go to the vault, and fill the scuttle.” He may have suspected some danger, and letting the “servant girl” lead he “followed her to the door with a lighted camphene lamp, and the instant the unfortunate woman opened the door, the gas ignited from the blaze of the lamp, and she fell upon the flagging.” The girl died from her wounds, while the ex-alderman,

¹¹³ “Explosion in Hanover Street,” *Daily Evening Transcript*, February 21, 1852, 2.

¹¹⁴ “Explosion in Hanover Street,” *Daily Evening Transcript*, February 21, 1852, 2.

¹¹⁵ *Report on the Erection of a Gasometer in Mason Street*, 18.

despite his attempt to distance himself from danger, survived with disfiguring burns.¹¹⁶ Two years later, “a little apprentice boy” arrived at the building of a New York book and stationery dealer to “the strong smell of gas.” As with the clerk and the servant, it was the apprentice boy’s job to proceed “with a lighted lamp into the basement, and upon bringing the light near the end of an inch-pipe which had been carelessly left uncapped, a terrible explosion occurred, the shock and report being felt and heard at a distance of two blocks.” Immediately, the stairway leading back to ground level “was entirely demolished, and portions of the floorings and ceilings of the first and second stories torn away and scattered in every direction.” Windows were shattered, fire ensued, but again, remarkably, though many were injured, no one died.¹¹⁷ A few months later, the same occurred at a New York paper warehouse when a gas fitter was inspecting a leak with “a lighted candle.” The resulting explosion “blew up the first floor, tore down the ceiling of the second story, broke the windows, shattered the rear office wall,” while a young employee “was blown through a window and landed on the sidewalk, but escaped unhurt.”¹¹⁸

It was not that these explosions were new or surprising. They were, rather, resonant confirmations of all the fears and anxieties of relying on a massive, antisocial, corporately controlled combustible infrastructure. As people experienced these explosions directly and indirectly through nationally circulated news reports, they were violently reminded of the price of living with the gasworks colonizing their cities. And though many suffered, it should be noted that in each case it was the servant, the clerk, the apprentice, the laborer who was forced to assume the most proximate and terrible risks of gaslight. Combined with the gendered displacement of camphene’s dangers seen in the previous chapter, the violence of gas lighting

¹¹⁶ “Explosion of a Gas Pipe in Broome-Street, Ex-Alderman Clayton Dangerously Injured,” *New York Daily Times*, December 25, 1852, 8.

¹¹⁷ “Fire in Nassau-Street. Gas Explosion—Several Persons Injured,” *New-York Daily Tribune*, May 22, 1854, 5.

¹¹⁸ “Gas Explosion at a Paper Warehouse,” *New-York Daily Tribune*, August 21, 1854, 3.

made the antebellum work of seeing through dark urban spaces into as much a vehicle for social hierarchy as into a rallying cry for public regulation.

Nowhere was this clearer than in the extent to which the liberal city sought to contain the laboring city by rallying to gasworks. An 1848 trade catalogue showcased this process in factories, publishing testimonials from satisfied customers. Large establishments with considerable illumination needs often preferred to make their gas themselves, rather than rely on the city gasworks. “We burn on average 100 Batwing burners, costing us less than one half cent per hour, for each burner,” the owner of a machine shop wrote approvingly to the makers of such a self-contained gas manufacturing system. Not only was it far cheaper than using oil or camphene lamps, but the “day watchman makes the gas without assistance and with no addition to his regular pay.” During the day a single worker could easily (and freely) make all the gas the machine shop would need to fuel a hundred lights for a few hours in the evening. These systems were also popular in cotton mills, as the light from gas burners was brighter than from oil lamps, and so easier on the eyes of grateful workers in carding, weaving, dressing, and spinning rooms.¹¹⁹ Moreover, these lights could be permanently and expertly placed, would not spill and start fires, and therefore afforded managers a far greater degree of control over the lighting and dangers of the mills. Such gaslit spaces were not necessarily any safer, but they did protect owners somewhat from arson and accidents by alienating factory hands from the work and means of lighting.

Together with the gaslights installed in the shops and offices described in the Gault trial, employers’ use of gas solidified their control over the length of the workday and so forced servants, clerks, apprentices, and factory hands to relax and replenish themselves at later and

¹¹⁹ Burr & Brother, *Solar Gas, made by a neat, simple, and economical apparatus, patented by James Crutchett, of Washington City, and which rapidly produces a cheap light of unequalled brilliancy, for lighting cities, blocks of buildings, churches, hotels, theatres, public halls, restaurants, steam-boats, mills, factories, and private residences* (New York: Jared W. Bell, 1848), 6-10.

darker times; they pushed the working class into the deadly embrace of piney light.¹²⁰ To protect their homes, property, and selves from the poor and uncouth, and to create a night space for respectable (and lucrative) night activities like shopping, dining, and attending theater performances, middle-class urbanites relied on bright streets like Broadway (the great white way) in New York.¹²¹ In antebellum cities both north and south, gas was the means of law, order, modernity, commerce. Without gas, city elites feared chaos and they feared stillness: rioting and a halt to work, exchange, and profit.

New York writer George Foster described the frontlines of this contested geography of light and darkness, in which gas lamps were like army forts radiating liberal power into hostile frontiers. Foster painted a midnight scene in the center of the Five Points, New York's most infamous urban frontier, where over "our heads is a large gas-lamp, which throws a strong light for some distance around, over the scene where once complete darkness furnished almost absolute security and escape to the pursued thief and felon, familiar with every step and knowing the exits and entrances to every house." Before that lamp had breached the Five Points, in "those days an officer, even with the best intentions, was often baffled at the very moment when he thought he had his victim most secure. Some unexpected cellar-door, or some silent-sliding panel, would suddenly receive the fugitive and thwart the keenest pursuit." Gaslights, however, promised to break open the Five Points to the powers of law and order and so "the large lamp is kept constantly lighted, and a policeman stands ever sentinel to see that it is not extinguished.

¹²⁰ See Chapter 2, "Piney Lights."

¹²¹ Baldwin, *In the Watches of the Night*, 14-103.

The existence of this single lamp has greatly improved the character of the whole location and increased the safety of going through the Points at night.”¹²²

Elsewhere, the liberal city was ready to sacrifice the laboring city to save its gasworks. In May of 1849, the city of New Orleans suffered a terrible flood, threatening not only the lives of thousands of poor and working families, but the city gasworks. “The water is pouring over the right bank of the canal in one almost unbroken sheet from the Basin to the toll gate,” reported the *Daily Picayune*, “presenting a beautiful appearance, although not appreciated by the residents in rear of the 7th Ward, who are seriously threatened by the encroachments of the flood.” This unstoppable rising tide had “already inundated Gravier, Common and some other streets in rear of the Gas Works, and as it rises with considerable rapidity, we are fearful that much damage will be done in this vicinity.”¹²³ As the flood continued, *Picayune* writers marveled there was “a fair chance that we are not to be left entirely in the dark, although we should be inundated. Col. Campbell is protecting the Gas Works by levees, and, although now surrounded with the waters, has rigged a steam pump which would keep the yard free, even if his levee were broken and the yard submerged.” Streets were flooded, but city officials were “in contemplation to establish a line of packets between the Gas Works and high-water mark in Canal street,” the energy and hopes of New Orleans’ elites desperately aimed at trying to keep their gasworks from being swallowed in water even as human residents drowned or were driven from their homes.¹²⁴

This was, as even the *Picayune* acknowledged, more a matter of priorities than possibilities. “A similar levee not more than five times as long,” they surmised, “extending from the New Basin, would have protected many long streets from overflow and had the levee of the New

¹²² George G. Foster, *New York by Gas-Light: With Here and There a Streak of Sunshine* (New York: Dewitt & Davenport, Tribune Buildings, 1850), 53.

¹²³ “The Overflow,” *Daily Picayune*, May 12, 1849, 1.

¹²⁴ “The Gas Works,” *Daily Picayune*, May 14, 1849, 1.

Canal been strengthened in time, the loss from inundation throughout the city” would have been negligible “compared with what it now is.” And such would have been entirely feasible, as “the Gas Works levee has employed the labor of less than fifty men,” with the result that “[we] have much faith now that we are not to be deprived of gas light.”¹²⁵ With pumps furiously keeping the gasworks dry, though completely surrounded by rising waters, the “danger from excessive rains is so feared at the Gas Works that another inside levee is to be constructed around the retort-house to insure as far as possible the requisite supply of gas.” But should the rains and waters continue, “it is not beyond the possibilities that we shall yet be left completely in the dark, and the oil and candle dealers succeed in their much talked of speculation.”¹²⁶

Apparently Col. Campbell and the slaves of the gasworks succeeded in keeping the flood at bay. Over three weeks later, the *Picayune* writers visited the still-islanded gasworks, noting “[a]pprehensions for the safety of the gas works of our city have been entertained by many, lest the flood might, by inundating the yards, put out the fires, and by injuring the machinery, &c., entirely destroy the works, and leave our city in that very ancient state of things ‘when darkness was upon the face of the deep.’” Traveling by barge through the flooded sections of the city, they arrived at the gasworks, which had “the appearance of an entrenched castle, an embankment of earth of about four feet having been thrown up all around it.” This was, they observed, “the only dry spot we know in the whole inundated district. It presents a singular aspect, the grounds of the work being about three feet below the surface of the water.” Proceeding to describe the heroic efforts of steam pumps, ditches, and trenches, the writers cheekily concluded, “We have thrown all the light we can upon the subject, and think our citizens need have no fears of being ‘left in the dark.’” The city’s poor neighborhoods, in good times blackened and poisoned by the

¹²⁵ “The Gas Works,” *Daily Picayune*, May 15, 1849, 2.

¹²⁶ “The Overflow,” *Daily Picayune*, May 16, 1849, 2.

incessant manufacture of gas, had now been left to drown while the city's gasworks had been saved. Rallied to by New Orleans's leaders, it continued to enslave; it continued to make gas; and it continued to keep the city from falling to that "ancient state" of darkness.¹²⁷

This desperate alliance of gasworks with liberal urban interests was replicated across the United States in the middle of the nineteenth century. In the aftermath of the 1848 fire that shut down the rosin gasworks of the New York Gas Company, plunged the city into darkness, and concluded the previous chapter, calls for public safety, and the public good led the company to abandon rosin and rebuild itself around coal. Coal was considered safer, more modern, and was growing cheaper. By 1850, the Philadelphia works were consuming half a million bushels of Pittsburg and Virginia coal each year.¹²⁸ By 1854, the Manhattan Gasworks, the other major supplier of the city, employed six hundred workmen, had 153 miles of street mains, 6,000 street lamps, over a thousand private consumers, and manufactured over 300 million feet of gas in a year.¹²⁹

As energy, capital, and the social relations of cities became more and more concentrated and contingent on the continued operation of gasworks, laborers working within the structures of gaslight found themselves in a radically different position than those without. In 1853, during a general mechanics strike in Baltimore, over two thousand railroad workers struggled for at least a week against their employers, while the "employees at the gas works struck to day for 15 per cent advance, which was immediately accorded to them."¹³⁰ It would take until during and after the Civil War for most gas lucifers to realize their strength, but the Baltimore mechanics strike

¹²⁷ "The New Orleans Gas Works," *Daily Picayune*, June 6, 1849, 2.

¹²⁸ "Philadelphia Gas Works," *Daily Picayune*, September 12, 1851; "Philadelphia Gas Works," *Daily Picayune*, 29 December 1854.

¹²⁹ "The Gas Works Explosion in New York," *Daily Picayune*, August 7, 1854, 1.

¹³⁰ "The Mechanics Strike in Baltimore," *New York Daily Times*, February 17, 1853, 1.

demonstrated the extent to which they were beginning to flex their muscle, holding in their hands as they did, the dark nightmares of propertied citizens (and voters).

Conclusion

Gaslight was a process of displacement, arrest, and pursuit. In this tangle of push and pull, capitalists and middle classes made and negotiated a new liberalism in the gaslit cores of cities by first displacing labor, violence, and accumulation out of class, out of homes, out of cities, and underground into enslaving coal dungeons. Meanwhile, through these coal dungeons and in southern gasworks, slaveholders were busy constructing an alternative liberalism, an alternative vision of social and technological progress founded firmly in industrial slavery. These internally related, but divergent gaslit projects also enabled the rigidly controlled division of space and time into labor and leisure (and unpaid work) in both “free” and slave cities. Most critical engagement with the history of gas lighting has focused on the liberalism of property, capital, and the pursuit of disorder and working-class culture into the night. It is told as a story of negotiated liberal actor-networks, and an emerging assertion of law, order, and middle-class mores.¹³¹ Yet if we look more closely at the private fixtures (which vastly outnumbered the public), if we take the story of domestic displacement as the center of this process, a new story may come into view.

The displacement of the work of light began as a displacement of gender and class from wealthy women to working-class servants, which was accomplished through camphene and its attending amplification of violence. Gas lighting transformed and accelerated this domestic displacement by expelling some servants, and industrializing the domestic work of light in male-dominated gasworks. These gasworks, in turn, depended on the displacement of accumulation to

¹³¹ See Christ Otter, *The Victorian Eye: A Political History of Light and Vision in Britain, 1800-1910* (Chicago: University of Chicago Press, 2008); Baldwin, *In the Watches of the Night*.

underground coal mines, where enslaved and free miners carried lights into new dangers, explosions, and the spatial politics of safety lamps.

Gas consolidated bourgeois consumption of lights and interests in monopoly relations, while laborers were forced to depend on fractured competitive chains of camphene. At the heart of this process of capital and social concentration, driving and being driven by it, was the enslavement and dislocation of thousands of black men in North Carolina turpentine camps and Virginia coal mines. In the antebellum era, slaveholders, industrialists, capitalists, insurance agents, and urban middle classes all conspired to imagine and enact a gaslit future of a liberal progressive city. It was a future wielded by its masters to enslave, endanger, and expropriate in the name of progress and the public good.

Contradictory impulses to reveal and to hide (from) labor shaped the incredible spread of gaslights and gas mines in antebellum America. Capital's anxiety toward its own power, towards its own relations of production helped drive technological structures of gaslight that hid laborers, hid labor, and celebrated scientific expertise inside bourgeois homes, shops, and in theaters. Yet at the same time, when employed in street lights and factory lights, gas was intended to reveal labor to the gaze of state and capital. Gasworks, moreover, materially solidified certain relations between state and capital in the form of "private" utilities and between state, capital, and private property in the systems of mains, meters, and fixtures passing through private and public space. This latter relation served to further drive city governments to sanction local monopolies and to forcibly equate their interests with something called the "public good."

As cotton spindles spun sperm oil away from lamps and into the darkness of lubrication in the decades before the Civil War, there occurred a much forgotten invasion of the continent, an invasion of explosive lights. They came from deep beneath the earth and from dark forests. They gorged on whales, traveled down rivers, canals, rail, and coast and descended upon the cities and

factories of the land. They were of metal and glass, turpentine and coal gas. These lights were not alive in the traditional sense, but the invasion was quite real and the specter and experience of fiery violence no fairy tale for the thousands of charred victims and the multitudes driven by fear before these deadly agents of fire and light. Of course, these explosive lights did not arrive in North America on their own, nor all at once. This was a gradual invasion, encouraged with invitations to fill the darkness left by the weak and weakening (but relatively safe and non-explosive) whale oil lamps. Welcome, however, did not mean obedient any more than newness meant simple superiority. The brighter, cheaper, more dangerous camphene lamps and gasworks that began to expand into streets, factories, shops, and homes to outshine sperm and whale oil shed light with different and often spectacular costs.

Much of antebellum American history stands as an (unsung) monument to this invasion, to the attempts to feed and control the lights manufactured from coal mines and turpentine camps, settling in cities as camphene lamps and massive gasworks. These lights were unlike the kinds of lamps, candles, and fires that for centuries had coevolved with the largely wooden environments of American cities. Where a candle might tip and set fire to a curtain, a camphene lamp might explode like a grenade, drenching anything, or anyone, nearby in liquid fire. When a gas main or gasholder exploded, it was more like the detonation of a powder magazine or a direct assault by a battalion of cannons.

These were lights that divided and took hostages. Their very instability, moreover, was as much a source of power as it was a rallying cry for their regulation or eradication. The struggle among producers and consumers, turpentine slaves and masters, miners and bosses, and public and private interests to control, displace, divide, and navigate the explosive and illuminated (and the explosively illuminated spaces) of coal mines, turpentine camps, camphene lamps and coal-gas works formed the story of the last two chapters. Where whale ships and street lamps

dominated the first chapter, these revolved around a very different geography of light, labor, and life—one marked by frontier work camps and the networks of rail, river, and canal connecting and dividing them from the swelling cities that they made possible. Instead of plying the high seas, these frontiers of luminous accumulation were reached by laboriously digging and exploding hundreds of feet below ground, miles from any city, and tapping, scraping, and distilling the vast piney woods at the margins of the South's tobacco-cotton-slavery empire. These were the dungeons and dragons illuminating antebellum futures, the webs of light forced to reinvent themselves or perish as those futures collided in the tectonic upheaval of the Civil War.

CHAPTER FOUR

“Prairie Whales”: Hogs, Lard Lights, and the Temporal Politics of Life and Death in the Antebellum Ohio Valley

The *prairie whale* is coming into competition with your *salt water fish*. Yes, the mud-wallowing *hog*, who has been despised by the Jews, chased by the dogs, and scorned by the world, is now becoming elevated in his condition, and throughout the West, is even now, a *burning and shining light*! You may “*blubber*” as much as you please at our *home* manufacture, and ridicule what you call “humbug Lard oil,” and in all this you will not effect any thing. Lard oil is used very generally in this section. Manufacturers cannot supply the demand for it. —*Cleveland Daily Herald*, November 9, 1842.

“Hark to the haste of pattering feet, That splash through the mud of the slippery street.”¹

The annual march of hundreds of thousands of hogs from Ohio Valley farms to Cincinnati, the world’s leader in pork packing, was enough to inspire poetry. “Here—gathered from the fruitful cornfields of Ohio, Indiana, and Kentucky, where their lives have hitherto passed in blissful ease,” waxed a Cincinnati observer, “comes a drove, staggering under the weight of their accumulations, to shed, like true patriots, their blood for the good their country.”² From November to February, a mere ninety-day naturally refrigerated window, farmers and drovers in a three hundred mile radius forced up to half a million hogs into Cincinnati by rail, steam, and hoof. There, the hogs were rapidly, and fatally, consumed in the city’s perfected system of mass death, now known widely as the disassembly line, emerging as lard and pork.

Like scores of travelers and scholars before and after him, Frederick Law Olmsted was irresistibly drawn to bear witness to this spectacle of carnage. “We entered an immense low-ceiled room and followed a vista of dead swine, upon their backs, their paws stretching mutely

¹ “Desultory Thoughts on Swine, Written at Cincinnati,” *Western Farmer and Gardener* 2 (February 1841): 105.

² “Desultory Thoughts on Swine, Written at Cincinnati.”

toward heaven,” he began, walking past those fallen “patriots,” who had, by this point, already shed their blood. Beyond the “vanishing point” of dead hogs lay what Olmsted could only describe as “a sort of human chopping machine,” and it was this that would make those deaths into something meaningful, into something valuable. “A plank table, two men to lift and turn, two to wield the cleavers, were its component parts,” wrote Olmsted, impressed by the simple, mechanical human elegance of the violence: “No iron cog-wheels could work with more regular motion. Plump falls the hog upon the table, chop, chop; chop, chop; chop, chop, fall the cleaver. All is over. But, before you can say so, plump, chop, chop; chop, chop; chop, chop, sounds again. There is no pause for admiration.” And as hogs became hams, shoulders, pork, and lard in the flurry of human labor, Olmsted did what any good capitalist would do; he timed it: “Amazed beyond all expectation at the celerity, we took out our watches and counted thirty-five seconds, from the moment when one hog touched the table until the next occupied its place.”³ Such a “human chopping machine” could consume, in a single working day, up to 850 hogs, or 170,000 lbs. of pork.⁴ And Cincinnati had scores of these machines. Here was, in many respects, the industrial center of the Ohio Valley. It was here where local hogs were ushered through the doors of death into a global marketplace of pork and lard lights; here, where the intimate living processes and products worked out between hogs, corn, land, and farmers spanning the Ohio River borderlands of freedom and slavery were concentrated; here, where wage-working packers violently transformed individual hogs into cheap, edible and combustible commodities circulating downriver through the stomachs of cotton slaves and brightly lit plantation houses, and across oceans through the nights and tables of American and European urban working classes.

³ Frederick Law Olmsted, *A Journey through Texas* (New York: Dix, Edwards & Co., 1857), 9.

⁴ Charles Cist, *Sketches and Statistics of Cincinnati in 1851* (Cincinnati: Wm. H. Moore & Co., 1851), 287.

The efficiency and scale of these operations vastly increased the margins of profit for Cincinnati packers, while opening up entirely new industries. And it was this that pushed Cincinnati into the history of light. Indeed, so extensive was the mass movement of hogs through Cincinnati's human chopping machines that the mountains of cheap offal, lard, and discarded flesh generated in the process made new by-product industries like soap, candles, and lard oil not only possible, but enormously profitable. This economy of scale, and its concomitant division of human labor, however, was only one part of the story. The processes and struggles that made wintertime Cincinnati into the world's most productive deathscape and created, from the carnage, an industry mass-producing candles and lard oil were never wholly, or even primarily, human dramas. To truly understand how, why, and with what repercussions antebellum Cincinnati became a central battlefield in the production of the means of light, we must first see hogs as more than simply objects of human labor. We need to see hogs as *themselves* living labor—as living, reproducing creatures with wants and fears, possessing the general ability to do work and survive in a range of environments, and the more specialized ability to transform certain plants, roots, nuts, bugs, and crustaceans into pork. It is not enough to say that pork was an important commodity in greater-Cincinnati. Living hogs and hogwork—that is, hogs as both product and labor—were inextricably entangled in human struggles in the Ohio Valley over property, class, white supremacy, slavery, and the power to determine when, where, and how to turn those living hogs into dead pork, and that dead pork into oil and candles.⁵

⁵ I am not attempting to give pigs back their “agency.” My goal in this chapter is rather to drive home the importance of understanding pigs as willful social organisms, as agents *of* processes (human and natural). Such an understanding is critical to making sense of the actually lived power relations of the antebellum Ohio Valley, and of the politics of white patriarchy more generally, where it entailed dominion over women, children, non-whites, and animals (and often mastery of a cereal-colonized landscape). The boundaries between each of these categories, or what/whom has been grouped with what/whom has always been absolutely political and fundamental to the political ecology of white patriarchy. For an excellent discussion of how to move beyond the human limitations of “agency” see Timothy Mitchell, “Can the Mosquito Speak?” in *Rule of Experts: Egypt, Techno-Politics, Modernity* (Berkeley: University of California Press, 2002).

The immutable facts that only hogs could directly make more hogs, and that they had to live before they could die socially useful deaths, always and everywhere shaped and strained human-hog relations. Two related but distinct questions, however, made this tension particularly unstable in the Ohio Valley. First was the question of “usefulness.” Hogs could do some socially useful things while alive (reproduce, root, travel, warm each other, clear fields, eat, shit, grow)—some of which could be done by a human workforce that might claim the rights to wages or to life—but it was the flesh harvested from their violent deaths for which people in the antebellum United States most valued hogs. Second, *how* people in a capitalist political economy valued hogs differently in life (as living, working property: livestock) and death (as tradable commodity: meat, candle, soap) mattered enormously. The struggles to navigate the relations and contradictions between the social lives and deaths of hogs formed the central dynamic in the making and mastering of the means of light in the region in and around antebellum Cincinnati. This chapter tells that story, beginning with the spatial and temporal division of the work of life and death.

Part of what made Cincinnati what it was, why disassembling hogs there and reassembling them as meat, soap, and lights was so profitable, was the cause and effect of a division of labor that has been all too easy to overlook. Most historians have been drawn, like Frederick Law Olmsted was, to the precise, machine-like division of slaughtering and packing. The specialization and sub-division of the work of hog- (and later cattle-) death was enormously important, forming one of the most critical sites in the American West for the production of not only cities and capital, but industrial time-discipline.⁶ However, by marking the beginning of

⁶ Herbert G. Gutman, *Work, Culture and Society in Industrializing America* (New York: Vintage, 1977); Steven J. Ross, *Workers on the Edge: Work, Leisure, and Politics in Industrializing Cincinnati, 1788-1890* (New York: Columbia University Press, 1985); William Cronon, *Nature's Metropolis: Chicago and the Great West* (New York: W. W. Norton & Company, 1991). Much of my thinking about space, time, animals, and meat is influenced by Cronon's treatment of meatpacking in *Nature's Metropolis*. His study is largely concerned with Chicago, however, and I differ from Cronon in my emphasis on the social relations and the division (in time and space) of the work of life and death.

industrial economy and social relations where animal life ended, where a human worker first (or at least most obviously) directly transformed pig flesh, historians of capitalism have cut out not only hogs from the story, but the whole social geography of hog life.

In and around fields, markets, hog trails, and hog pens, men and boys managed and oversaw the bio-work of countless hogs, making captive and semi-captive hogs immediately responsible for the work processes of turning corn and acorn mast into pork, lard, and manure, of making more hogs, and of moving themselves on foot over field, stream, and road. The spectacular profits and rise of the Cincinnati pork packers and candle manufacturers rested squarely on an increasingly refined and organized rural system of exploitation, one by which the masters and managers of living hogs squeezed the most biological work in the shortest possible time from their porcine property. Meat-packing centers like Cincinnati and Chicago—those urban crucibles of industry, class, and time that have understandably and rightfully drawn the attention of Western travelers and historians—were but the most visible tips of economic spaces that farmers and drovers made possible by forcibly drawing the timelines and lifetimes of millions of hogs across thousands of square miles of seasonally shifting rural terrain and transportation networks towards just such urban convergence points in time and space and death.

Each year, the negotiated, contested movement of hogs from farms, plantations, and woods stitched together a patchwork process of life across the interstices of a shifting landscape. But while the precise shape and pattern of this annual patchwork was continually shifting, two poles remained firmly anchored and separated in the process, their bridging forming the challenge and substance of each year's hog trade. These were the deathscapes and lifescapes.⁷

⁷ My use of the terms “deathscapes” and “lifescapes” is inspired by Thomas Andrews’ concept of the “workscape.” What I hope to emphasize is that the full extent of the workscape of pork-packing and its by-product industries of candles and soap—the worked environments produced for and through Ohio Valley hog industries—can only really be understood by recognizing that it was constituted through a spatiotemporal and social division of the labor

The Geography of Life

*the hog is not a native of Cincinnati. He originates in the provinces, on the farms and prairies of the great valley of the Ohio. The Queen City is the Mecca of his reluctant pilgrimage; the final goal of his pious ambition. To be born a pig and not die the death of a hog in Cincinnati were an ignominy that none but the most groveling and debased swine could endure. The litter sort will not submit to it. The stall-fed, corn-fattened hog, contemplates the purpose of his life from a higher point of view. He is actuated by a nobler motive. He realizes the aspiration and enthusiasm of the enraptured poet; he must see Cincinnati, and die.*⁸

By the antebellum period with which this chapter is concerned, settler farmers, planters, slaves, U.S. armies, and state institutions had, for over a generation, transformed, broken up, and policed the Ohio Valley into fractured mosaics of agricultural property lines, a process that greatly accelerated following the early republican wars and land treaties with Indian nations and European empires.⁹ Ohio Valley farmers faced continual challenges to raising and then transporting hogs and corn, organisms that despite thousands of years of domestication only ever imperfectly respected the boundaries and allegiances of social institutions like fenced landscapes. But unlike in the European and Atlantic crucibles that had, over centuries, conceived, subjugated, and naturalized the property regime over land, animals, and people that American settlers had carried with them over the Appalachians, the spaces and times through which Ohio Valley farmers herded their hogs were, to an unusual degree, stretched and compressed by seasonal cycles of rains, mud, freezes, and thaws.¹⁰

Made in and over space, the social lives of hogs were also temporal processes woven through and around the biological cycles of corn and hogs, the economic price cycles of corn,

processes of life and death. Hence, lifescapes and deathscapes. For more on worksapes, see Thomas Andrews, *Killing for Coal: America's Deadliest Labor War* (Cambridge: Harvard University Press, 2008), 87-196.

⁸ "The Hog Trade of Cincinnati," *Harper's Weekly*, February 4, 1860, 72.

⁹ For an overview of the westward expansion of U.S. empire, see D. W. Meinig, *The Shaping of America: A Geographical Perspective on 500 Years of History*, vol. 2, *Continental America, 1800-1867* (New Haven: Yale University Press, 1993).

¹⁰ Louis C. Hunter, *Studies in the Economic History of the Ohio Valley; Seasonal Aspects of Industry and Commerce before the Age of Big Business: The Beginnings of Industrial Combination* (Northampton, Mass.: Department of History of Smith College, 1934); Steven Stoll, *Larding the Lean Earth: Soil and Society in Nineteenth-Century America* (New York: Hill and Wang, 2002).

whiskey, pork, and lard, and the cyclical movements of farm hands and slaves from fieldwork to post-harvest urban employment. Ensuring that cycles of biology, ecology, and climate in the Ohio Valley all aligned in the right places and times with cycles of economy remained an ongoing challenge that demanded new configurations. In order to transplant and reproduce an Anglo-American property regime, Ohio Valley farmers, planters, merchants, and manufacturers allied with states and industrialists to form new spatial organizations and transportation technologies. This spatial process of reinvention, moreover, contributed immensely to the centralized, core-periphery geography of death and life that made the Ohio Valley into such a tremendously productive vector for hog death and lard lights.

In 1840-41, Thomas Affleck, as editor of the Cincinnati-based publication, *The Western Farmer and Gardener*, devoted considerable energy to promoting the ideas and practices of scientific management among Ohio Valley hog farmers. Affleck, like Solon Robinson of Indiana and other agricultural reformers at the time, was part of a broad movement that encompassed farmers and commentators from across all regions of the United States, including free-soilers and pro-slavery advocates.¹¹ However, a closer examination of Thomas Affleck's career, who transitioned seamlessly from Ohio agricultural reformer to Mississippi plantation account management book author and promoter, suggests that the pro-slavery and free-soil factions in the movement may have shared more than a common concern with manure and migration. Indeed, the scientific

¹¹ As the historian Steven Stoll has documented, what brought these reformers into conversation, despite their diverse backgrounds, regional loyalties, and politics was a shared concern with soil, manure, and westward migration. Reformers focused in large part on finding better (and less-labor intensive) methods for making use of animals and their manure, in order to recycle the soil nutrients and minerals taken out of the land by crops and erosion. Primarily, they were worried that American farming and planting practices were unsustainable and unstable. Everywhere they looked, reformers saw neighbors exhausting the soil too quickly in search of quick returns and an effort to avoid the more labor-intensive practices associated with European agriculture (where labor was cheaper). Instead of seeking independence and sinking deep roots in the land, reformers complained, most farmers pursued only profit, ultimately contributing to the instability of farming communities as people had to continually uproot and abandon exhausted lands, entangling them in further speculative debt-relations and migrations, and thus threatening the Jeffersonian dream of an independent republican landed citizenry. Steven Stoll, *Larding the Lean Earth: Soil and Society in Nineteenth-Century America* (New York: Hill and Wang, 2002).

management techniques being brought to bear in Southern slave plantations and Northern livestock farms were part of a broader revolution in the management of unfree labor and living property, and one with important implications for the management of factory free labor.¹²

At the metabolic center of this antebellum geography of human and non-human labor lay a deceptively simple material relationship between soil and the gastro-intestinal tracts of hogs. It was the bio-work by which hogs were made, fields planted and cleared, and droves powered on their march to slaughter. It cycled corn into pork and shit, and shit into more corn. It was the mushy, rooting, smelly labor process that white farmers and herdsman exploited to pursue a political vision of rural republican independence—a politics of white supremacy, patriarchy, and husbandry that herded hogs through life and death and markets so that black slaves could be fed, white wage-working men employed, women and families “provided for,” and cheap lights mass produced.

Reproducing Hogs

First, the primary workers, the hogs, had to be made. Hogs had large litters, twice a year, and gained weight faster than cattle while requiring less fodder.¹³ Caring for hogs, which were intelligent and resourceful omnivores, may have been relatively easy compared with raising sheep, horses, or cattle, but it was hardly a sure thing, and competitive markets pressured farmers to get the most out of their hogs. This encouraged farmers to cull, assemble, and discipline a productive and competitive hog labor force from birth. Channeling the inherited wisdom of mid-century hog raisers, the Indiana farmer and agricultural reformer Solon Robinson admonished hog-

¹² For a more thorough discussion of the practices of accounting in slavery see, Caitlin Rosenthal, “Slavery’s Scientific Management: Accounting for Mastery,” forthcoming in *Slavery’s Capitalism*, eds. Seth Rockman, S. Beckert, and D. Waldstreicher (Philadelphia: University of Pennsylvania Press).

¹³ Robert Leslie Jones, *History of Agriculture in Ohio to 1880* (Kent, Ohio: Kent State University Press, 1983), 123.

raisers that they “ ‘must first select the right kind of critter.’ ” A hog-raiser, he contended, should start with piglets of “ ‘the right breed, and then pick out the good-natured ones from the litter; I can’t afford to feed a cross critter; I sell them when they are pigs.’ ” For farmers, moreover, describing a hog as “cross” was an expression of the limits of biological mastery, where the nature and personality of individual pigs rubbed up against the expectations and demands that farmers made of those natures. In other words, “crossness” had everything to do with the core metabolic processes of the pigs that farmers hoped to exploit: “ ‘How can you judge?’ said I. ‘Well, if you watch them when they are feeding, you will find that some pigs are allers fighting about their victuals, and some go in for eating. There is as much difference in pigs as there is in folks.’ ”¹⁴

Culled through careful examinations and market exchanges, farmers continually policed and purified their hog workforces. But this could never remain a simple process of observation and selection. Farmers had to intervene in and assert control over the relations of hog reproduction, focusing their efforts on their sows, and forcing the behavior of those sows to align with the interests of their owners. Sows, at least those living in captivity, frequently killed and ate their young, a problem common enough that Solon Robinson publicized and endorsed “an easy and sure prevention, ‘to give the sow about half a pint of good rum or gin, which soon produces intoxication, and the drunken mother becomes entirely harmless toward her young, and will ever accommodate her position to the best advantage of the pigs, retaining this disposition ever afterward.’ ”¹⁵ Using liquor to subdue and discipline their female hogs, farmers tried to control, rationalize, and increase the productivity of hog reproduction.

The main purpose of disciplining sows was to keep them from interrupting the chain of nutrients that farmers hoped to usher through their property, from soil into corn into hogs (then

¹⁴ Solon Robinson, ed., *Facts for Farmers* (New York: Johnson & Ward, 1865), 27-28.

¹⁵ Solon Robinson, ed., *Facts for Farmers*, 29-30.

back into soil as manure) over the hogs' entire lifetimes. The only way for farmers to maintain this nutrient chain when their livestock were still piglets was to pass it first through a sow in the form of milk. The importance attached to this critical stage in the production of hogs meant that it was often separated out spatially from the rest of hog lifework processes, with farmers erecting special structures for nursing: "Sows that have pigs ought to have different keeping from what hogs generally have. In order to have their offspring do well, they not only must have meal, but a good supply of milk, or whey."¹⁶

Starting with "good natured critters" and keeping them alive was a critical first step, but as any farmer knew, productive hogs were not just born. They were trained and made. So were hog-overseers. "My own training in the business was of course progressive," recalled Edmund Cody Burnett, a mid-century Tennessee hog farmer and local historian, which "began when, as a child, I gleefully watched the little pigs get their meals from mammy sow, squealing and squirming and wagging their tails and scrambling for their specially reserved places at the pig dining table." If the piglets survived weaning, farmers were quick to initiate them into the harsh process of transforming pigs into private property, as Burnett learned later "when a terrible squealing at the barn drew my curiosity thither, where, through a crack, I perceived that something fearful was being done to the pigs with knives and needles ... One thing that particularly worried me was that they cut off the pigs' pretty tails. How could they get their dinner with no tails to wag?"¹⁷ Shorn of their tails, young pigs were further mutilated to inscribe property relations into their flesh: "With hogs belonging to so many different people running loose, it was necessary that they be marked. My father had, I think, the simplest mark in our

¹⁶ "Management of Swine—Cooking Food," *Prairie Farmer* 3 (January 1843): 13.

¹⁷ Edmund Cody Burnett, "Hog Raising and Hog Driving in the Region of the French Broad River," *Agricultural History* 20:2 (April 1946): 94-95.

entire valley, which was a smooth crop off the right ear... Other marks that I became acquainted with were: half-crop, swallow-fork, underbit, overbit, hole, slit, in one ear or both ears, singly or doubled, in almost any possible combination.”¹⁸

In most hog-raising regions south of the Ohio River, farmers let their young pigs run free through common lands and woods, to feed on grasses and mast (acorns, beechnuts, chestnuts, etc.), or “they might roam up and down the creeks, where they would find some mast, but more particularly other food to their taste, such as crawfish.”¹⁹ This hog-mediated process of converting public into private domain was true also for early Ohio farmers, but by the antebellum period, most hog-raisers in the North kept their livestock within more managed and enclosed landscapes and feeding spaces.²⁰ Plantations always raised some hogs, but the vast majority of the pork grown in the South—much of it destined for slaves even if it first passed through packing centers like Cincinnati—was raised by yeoman farmers. They were the “poor” whites who owned no more than a few slaves (if any), imagined themselves culturally distinct from both large planters and Ohio abolitionists, measured their freedom and superiority against the domination of black slaves and “wage slaves,” and secured their economic “independence” by owning and selling goods (like hogs or pork) and services directly or indirectly to the plantation economy.²¹ As such, their hog commons were implicitly racialized. “Unfenced

¹⁸ Burnett, “Hog Raising and Hog Driving in the Region of the French Broad River,” 95.

¹⁹ Burnett, “Hog Raising and Hog Driving in the Region of the French Broad River,” 95.

²⁰ Jones, *History of Agriculture in Ohio to 1880*, 121.

²¹ Eugene D. Genovese, “Livestock in the Slave Economy of the Old South—A Revised View,” *Agricultural History* 36 (July 1962): 143-149; Sam B. Hilliard, “Pork in the Ante-Bellum South: The Geography of Self-Sufficiency,” *Annals of the Association of American Geographers* 59 (September 1969): 461-480; Forrest McDonald and Grady McWhiney, “The Antebellum Southern Herdsman: A Reinterpretation,” *Journal of Southern History* 41 (May 1975): 147-166; Grady McWhiney and Forrest McDonald, “Celtic Origins of Southern Herding Practices,” *Journal of Southern History* 51 (May 1985): 165-182; Grady McWhiney, *Cracker Culture: Celtic Ways in the Old South* (Tuscaloosa: University of Alabama Press, 1988); Timothy Cuff, “A Weighty Issue Revisited: New Evidence on Commercial Swine Weights and Pork Production in Mid-Nineteenth Century America,” *Agricultural History* 66 (Autumn 1992): 55-74; Ronald J. McCall, “Never Quite Settled: Southern Plain Folk on the Move” (master’s thesis, East Tennessee State University,

territory was free to all comers—provided they came on four legs,” Burnett wrote ominously.²² Hogs may have been free to range white southern commons, but slaves and strangers were another matter.

In the agricultural regions of the northern side of the Ohio River, on the other hand, especially in the corn and livestock centers along the Miami and Scioto rivers, a more complete and enclosed private property regime led to different spatial politics and demanded other forms of hog discipline. Whereas south of the river, the energies and attentions of the ruling classes were more focused on constructing and maintaining a carceral landscape for containing and working human property, in Ohio and Indiana those energies were devoted to controlling and working animals.²³ “As a general rule, our domestic animals are never unruly, except when taught to be so,” claimed Solon Robinson. Complaining that too many lazy farmers, when “turning stock from one field to another, only let down a few of the top rails or bars and force the animals to jump over,” Robinson feared that hogs were being taught to disregard, and even destroy, the barriers and divisions of private property, the fenced carceral landscapes that farmers relied on to control and exploit their hogs. To discipline and educate animals that had to be free to find fodder, but not so free as to escape their condition as private property, one “writer says his practice has always been to teach his ... hogs to go through or under, rather than over, the bars

2013). See also Stephanie McCurry, *Masters of Small Worlds: Yeomen Households, Gender Relations, and the Political Culture of the Antebellum South Carolina Low Country* (New York: Oxford University Press, 1995); Scott Nelson, “Livestock, Boundaries, and Public Space in Spartanburg: African American Men, Elite White Women, and the Spectacle of Conjugal Relations,” in *Sex, Love, Race: Crossing Boundaries in North American History*, ed. Martha Hodes (New York: New York University Press, 1999), 313-327.

²² Burnett, “Hog Raising and Hog Driving in the Region of the French Broad River,” 95.

²³ For more on the theory and history of “carceral landscapes,” see Walter Johnson, “The Carceral Landscape,” in *River of Dark Dreams: Slavery and Empire in the Cotton Kingdom* (Cambridge: Harvard University Press, 2013), 209-243.

or fences, always leaving a rail or bar up at the top. Taught this way, they never think of jumping, and he has never been troubled with unruly animals, even when his fences were low.”²⁴

Most farmers timed it such that their pigs were born in the winter and early spring, dividing the times and spaces of lifework into “raising” and “fattening.” Partly this had to do with the cyclical price of corn, but an even more important reason had to do with the ecological work farmers expected to extract from the hogs they were “raising.” Farmers began raising in the spring, and while practices differed across regions and from farmer to farmer, raising often meant that the hogs were expected to gather their food on their own in either field or forest.²⁵ This saved labor, minimized supervision, and even helped to close the metabolic loop between soil and animals, by leaving pigs to defecate on the land that nourished them.²⁶

The Pig-Pen Complex

But many farmers took this a step farther, and sought to multiply their gains by directing this lifework into transforming their land. One planter, frustrated by the relentless advance of “the despised wire or joint grass” over his cotton fields, sought to deploy his hogs against this counter-plantation ecological agent. Wire grass, with its thick root clusters grabbing hold of soil meant for cotton and choking out any new plantings, “had so taken possession of some bottom land which I cultivated, that I concluded it was vain to attempt to make cotton longer upon it. Knowing that hogs were fond of it, I concluded to fasten hogs up in the field without any other food, to see if they could live upon it, and in some degree destroy it, or at least thin it, so as to

²⁴ Solon Robinson, ed., *Facts for Farmers*, 62.

²⁵ Jones, *History of Agriculture in Ohio to 1880*; Stoll, *Larding the Lean Earth*.

²⁶ For more on hogs, manure, and hogs as manure manufacturers, see: “A Hamilton County Farm,” *Western Farmer and Gardener* 2 (November 1840): 35; The American Farmer, “Making Pork—Cooking Food for Animals,” *Western Farmer and Gardener* 2 (December 1840): 61; Solon Robinson, ed., *Facts for Farmers*, 23-24, 26-27; “Hog Raising at the South,” *Southern Cultivator* 19 (March 1861): 73-75.

render the land fit for cultivation. The hogs were put in in February, 1840, when very poor. Result, in four weeks: they were in order fit for pork, and had rooted the field where the grass grew, like a potato-patch where hogs had run.”²⁷ Using railings and fences to contain and concentrate the lifework of his hogs onto particular parts of his land, this planter was able to keep land suitable for cotton, raise his hogs on grass he didn’t have to force his slaves to plant, and while “the grass was much thinned out last year, so as not to injure the corn or cotton crop upon it, my hogs look as fat as I have ever saw hogs upon peas or potatoes.”²⁸ Put another way, this planter turned his hogs’ will to life into labor that he neither had to pay for, nor coerce from his slaves: “free” labor that was pro-cotton, pro-slavery, and pro-pork all at once. This process was one of the central political ecologies from which the candle and lard oil industries made themselves, and which they thereby reinforced.

Another widespread method was to cycle clover or peas through land that farmers were resting from corn (or cotton).²⁹ But this practice could never be understood in purely ecological terms. The spatial relations in the production and consumption of the means of hog life depended as much upon political economy as they did issues of energy efficiency. “Where land is cheap and easily tilled, and labor dear, as in the west,” noted the editors of the *Prairie Farmer*, “it may be best to make hogs their own harvesters. Thus prepare clover, oats, early corn and buckwheat, and let hogs eat them in succession.”³⁰

Moveable fences were critical technologies in guiding this hog work over land and season, so that such crops “will last till the ordinary field corn is ripe enough. If a moveable fence is

²⁷ The Farmer’s Register, “Wire Grass destroyed by Hogs,” *Western Farmer and Gardener* 2 (July 1841): 228.

²⁸ The Farmer’s Register, “Wire Grass destroyed by Hogs.”

²⁹ Jones, *History of Agriculture in Ohio to 1880*, 124.

³⁰ “Cooking for Swine,” *Prairie Farmer* 10 (October 1849): 304-305.

provided to confine hogs to a small quantity, little is lost by field feeding, unless the weather is wet, when so much will be tramped in, that it is advisable to feed corn cut up and carried to a dry lot, where there is water.”³¹ The moveable pig-pen complex assembled hogs, soil, and plants into some of the most effective ecological agents of agricultural space in the Ohio Valley. Advising his readers of ways to “make the pig-pen valuable,” Solon Robinson suggested using hogs to de-grub and improve grass land: “Fence off a piece, and shut your swine in upon it for a few days without feed, and if they leave a sod unturned or grub uneaten it will be a wonder. It is the best preparation of such a spot for a hoed crop, or for sowing again in grass, that can be given. There is no good reason why the pig should be always kept in idleness and mischief. Let him be trained to be useful in his life as well as at his death.”³² The pig-pen complex was the outcome of a struggle among farmers, hogs, and herders in which farmers fighting to better realize and protect a landed private property regime triumphed over a more migratory regime of swineherds and commons. With fence and cadastral map, farmers transformed (parts of) a geography of hog transhumance into a constellation of forced labor pens.

Looked at from a slightly more Marxian perspective, feeding in the field also allowed farmers (and market relations) to both create and measure the value of land as an expression of socially average hog labor. According to Solon Robinson’s *Facts for Farmers*, “It may be safe to calculate that a good-sized, thrifty pig will gain in six months, on grass, 100 lbs. or more. If an acre of grass would keep three hogs and add 100 lbs. to the weight of each, that would be \$12 for the acre of pasture, reckoning the 300 lbs. gain at four cents a pound, live weight. Instead ... imagine a clean and comely Suffolk in a fresh, green pasture of clover, four inches high, filling

³¹ “Cooking for Swine,” *Prairie Farmer* 10 (October 1849): 305.

³² Solon Robinson, ed., *Facts for Farmers*, 27.

himself with evident relish.”³³ By calculating the value of an acre of pasture (average grass land) according to the value of the pork that an average hog could produce with it, it seems clear enough that socially average labor, as Marx insisted, was determining value. There is no getting around the fact, however, that this was *hog*, not *human* labor, and that farmers imagined creating surplus value through improving relatively the means of production (from grass to clover, and from average to “improved” breed). Both liberal and Marxian theorists, by restricting agency within the sphere of circulation and exchange to reified liberal subjects or free “human beings,” have mystified not only the human labor process, but the expropriation and exploitation of living labor across lines of species and subjecthood.³⁴

Confining hogs in more permanent pens or barns and feeding them milled or cooked corn could be a more efficient (or at least quicker) way of causing hogs to gain weight, but only where hogs were selling high, corn low, and labor not too dear. One observer calculated that if hogs were worth “\$3 per cwt. gross” (per each hundred lbs. of live weight) and the hogs were “confined in pens, dry corn is worth thirty cents, and meal, cooked as above is worth over fifty cents; so that there is a gain by grinding and cooking, over feeding in the field, of one hundred and fifty per cent. The expenses, however, are to be deducted, and these depend on the price of wages, wood and milling.”³⁵ Efficiency and expense were always pressing concerns. It was a broader and more heated spatial politics of enclosure, exclosure, and fugitive hogs, however, that ultimately led increasing numbers of farmers to confine and feed their hogs this way while raising and fattening. Simply put, hogs and their owners did not come easily to respecting fences as absolute barriers. Enclosure in the West was a gradual process, with some fiercely resisting the

³³ Solon Robinson, ed., *Facts for Farmers*, 26.

³⁴ For further discussion along these lines see: Mitchell, *Rule of Experts*; Gunther Peck, “The Nature of Labor: Fault Lines and Common Ground in Environmental and Labor History,” *Environmental History* 11 (April 2006): 212-238.

³⁵ “Cooking for Swine,” *Prairie Farmer* 10 (October 1849): 304.

elimination of the hog commons while others pressed hard against letting any animals run “wild.” “I hope the voters of Scott county come up to the polls in April, and vote for the law prohibiting hogs from running at large,” wrote one Iowa farmer in the *Davenport Gazette* who hoped to legislate the region into modern political economy, noting, “It is now the law of Clinton county, and will be that of Cedar and Jones after next July. It is the law of more than one-half of the State of Pennsylvania, why not then be the law here?”³⁶

On top of simply keeping up with the rest of the agricultural world, most pro-pen commentators tried to make the case that wild, “unruly” hogs would not fatten well. It was an argument that masked a good deal of violence and downplayed the very real power that hogs wielded in these landscapes. One farmer claimed that “hogs should be kept as gentle and tame as possible, for it is almost an impossibility to fatten a wild hog.”³⁷ According to the Davenport farmer pressing for new fencing laws, “Take a hog that has run out all summer, and confine it in a pen to fatten, and it will take at least 20 bushels of corn to make it weigh 200 pounds, whereas a hog that is shut up all the time, can be fatted with 10 bushels.”³⁸ Another argued that hogs required the same amount of food whether loose or shut up, but that they put on weight more quickly when confined, and so “consequently you would save 10 bushels of corn on every hog you raise, by keeping them confined—this is worth \$2,00.” And confining hogs made even more sense in the west, because “You will also save your fences. Wire fence to turn cattle can be built for fifty cents per rod that will last 20 years, but it is difficult to make a wire fence to turn hogs.”³⁹

³⁶ Davenport Gazette, “Cost of Hogs at Large,” *Prairie Farmer* 11 (April 1851): 181. For more on the nineteenth-century politics of livestock and fenced landscapes, see Steven Hahn, *The Roots of Southern Populism: Yeoman Farmers and the Transformation of the Georgia Upcountry, 1850-1890* [1983] (New York: Oxford University Press, 2006).

³⁷ B. F. W. Stubbing, “Fattening Hogs, &c.,” *Prairie Farmer* 12 (October 1852): 472.

³⁸ Davenport Gazette, “Cost of Hogs at Large.”

³⁹ Davenport Gazette, “Cost of Hogs at Large.”

Wooden picket fencing, even where materially possible, was also problematic. Indeed, the confluence of hogs, climate, and environment in the prairie states rendered moot the fencing strategies that worked well elsewhere. “I have this spring tried Mr. Kennebec’s method of fencing, and find it makes a good and handsome fence,” wrote one western farmer, “but the cost to me is over forty cents to the rod, as I put on more pickets. I find that if only this number are put on a shoat with a dog after it, can go through without greasing, taking two or three palings with him.—Picket fence, as it has generally been built in this county, is a perfect nuisance. The posts set eighteen inches deep, and badly set at that, will not stand more than one season...”⁴⁰

In western prairies and pastures, where wood and free labor were relatively scarce and settlements sufficiently diffused, hogs appeared to be especially empowered to subvert enclosed and fenced-in landscapes. This necessitated a kind of volunteer hog patrol army. Describing his training in the hog raising business in Tennessee, Edmund Cody Burnett recalled that “when nimbleness of feet and legs was called for, as when the hogs had broken into a forbidden cornfield, it was I, the small boy, who was all too often assigned the task of chasing them out. Then I began to dislike hogs.”⁴¹ As hogs defied fences, disrespected ownership, and grazed across property lines, they revealed and exacerbated some of the internal contradictions in the region’s private property regimes. Swineherds who were primarily invested and interested in their hogs for sale were more than content to let their livestock run wild, feeding themselves from common lands, and to attach their property claims directly to their pigs. Farmers more invested in working and owning their land, however, thought of hogs and their relations to space quite differently.

Even when primarily interested in raising hogs for sale, the more farmers diversified their commercial activities into plants (especially corn), the more they sought to root hogs and their

⁴⁰ W. A. J. Russell, “Stone Coal for Hogs. Locust Trees,” *Prairie Farmer* 6 (September 1846): 281.

⁴¹ Burnett, “Hog Raising and Hog Driving in the Region of the French Broad River,” 95.

lifework in the delineated soil of the privately owned farm. Yet as corn increasingly colonized the landscape, hogs had even less cause for staying close to their masters in order to find food. Some farmers, moreover, undoubtedly would have recognized that if their hogs “escaped” and ate their neighbor’s corn, it was, for the owner of the hogs, a subsidy akin to that of the commons.

Controlling hogs’ access to corn, both within one’s own land for one’s own hogs and across property boundaries for another’s hogs, emerged as a critical problem in the hog-corn belt. And forcing hogs to adhere to the rules and expectations of this spatial regime was part of what farmers meant when they said “hogs should be kept as gentle and tame as possible.”

Keeping hogs gentle, however, was no easy task. It was “customary with some farmers, if a hog don’t exactly please them,” claimed one reformer, to “set a dog on them, and ... literally amputate their ears; but this, in general is a very bad practice.” Instead of torturing and terrorizing hogs, enlightened commentators like this farmer recommended an olfactory discipline, one designed to confuse, disgust, and haunt hogs such that when they “become troublesome about getting into the corn field, and waste corn, a good method to keep them out is literally to soak their insides with a mixture of bran shorts, clabber [spoiled, curdled milk] and buttermilk, this applied to them daily in the above manner, will soon enable any farmer to keep them out of mischief [sic].”⁴² Indeed, mischief seemed the word of choice. “Hogs running at large are always in mischief,” wrote one pro-fence reformer, who was “satisfied that, for the last five years, there has been more destroyed by hogs than all the exports would amount to of pork from Scott county for the same length of time.”⁴³ Another editorial described how such a spatial politics could devolve an agricultural landscape into an archipelago of armed encampments, where a Mr. Hardup “tells us of a neighborhood where they use the rifle when a neighbor’s hog gets into their

⁴² B. F. W. Stubbing, “Fattening Hogs, &c.,” *Prairie Farmer* 12 (October 1852): 472.

⁴³ Davenport Gazette, “Cost of Hogs at Large,” *Prairie Farmer* 11 (April 1851): 181.

fields of grain. To say the least, I should not like to live in such a neighborhood, not because I should fear some one might kill my swine, for I keep my hogs in close quarters; but for the want of good feeling in such a neighborhood.”⁴⁴

The Times and Spaces of Fattening

It was neither practical nor possible to fatten hogs all year or in all places. What was nearly universally accepted as essential, however, was that hogs be kept continuously growing from birth to death. This generally meant hogs would be fed on clover or grass via the mobile pig-pen complex for the summer months. Fattening was confined to the autumn months, usually a period no longer than six to eight weeks, and was almost exclusively an affair of corn. Most everyone agreed, moreover, that farmers should strive to get hogs to weight (between 250 and 300 lbs.) by ten or twelve months of age.⁴⁵ The race to weight was so crucial because winter loomed perpetually over the temporal landscape of the Ohio Valley hog industry. It was the only time when the entropy of decay was sufficiently slowed to accommodate the mass disassembly of organic tissues, but it was also a time when merely living required increased expenditures of energy to survive. Winter thus transformed the Ohio Valley into a temporal terrain with a much higher degree of friction of lifework at the same time that it markedly lowered the friction for the work of death. Threading a hog's life from sow to pork packer without having to winter the animal meant circumventing the fat-sapping cold, higher costs of fodder, and slowed rate of growth. Furthermore, the extra human labor necessary for accelerating, scaling up, and industrializing the fattening of hogs was not readily available until during and after harvest. This put even more pressure on enterprising hog farmers to make fattening time count.

⁴⁴ R. Cheney, “Unruly Animals, Poor Fences, and Neighbors,” *Prairie Farmer* 7 (April 1847): 115.

⁴⁵ Jones, *History of Agriculture in Ohio to 1880*, 124-127.

The race to weight also propelled hundreds of thousands of hogs each year into migratory movement through the uneven geography of life in the Ohio Valley. The production of living pork and the race to weight was more than a temporal passage rooted in space. It was also a spatial process of punctuated bouts of migration and arrest, driving hogs into ever greater concentrations (and weights) as they converged steadily toward the winter death complexes. The movement of hogs through these chains of carceral lifescapes produced a spatial and class division between two types of farmers, called respectively “growers” and “fatteners.” Sometimes growers were merely the smaller, poorer neighbors of large farmers who controlled access to better land and equipment, but just as often, growers operated many miles away from the nearest fattener. Fatteners, on the other hand, tended to cluster near the rivers, canals, and railroads that fed into the pork-packing centers. What all fatteners had was corn. For that reason, the areas, such as the lower Miami Valley in which Cincinnati was situated, where corn was grown or accumulated, were also where hog fatteners were to be found.⁴⁶

What made this divided geography of life possible was that the relatively leaner “stock hogs” that growers sold to fatteners were much better and more efficient travelers than they would become once fattened. As such, hog farmers in the upland counties of Ohio, Kentucky, and Indiana raised tens of thousands of hogs on clover and grass in the spring and then sent the strong, but lean animals to lower Miami Valley fatteners in the late spring and summer. Farmers

⁴⁶ Jones, *History of Agriculture in Ohio to 1880*, 124-127. “Three distilleries in Miami County in 1849 had on hand an estimated total of 6,000 hogs, and in 1853 two at New Richmond in Clermont County had between them 16,000 or 17,000. The practice of the distillers was to buy stockers in the spring at weights of from 100 to 150 pounds and feed them on hot slop till October, when they would have approximately doubled in weight. The pork thus produced was not considered suitable for packing, as it would not ‘take salt’ well, nor was its lard as good as that from corn-fed hogs, but the meat was supposed to be good while fresh” (127). Interestingly enough, this was yet another instance in which the antebellum modes of producing the means of light heavily interpenetrated one another. The hogs fattening on the waste of whiskey, in effect subsidized the production of such spirits, the very spirits further distilled in such vast quantities in cities like New York that allowed camphene to be made so cheaply. Thus the violent regime of lifescapes and deathscapes through which the masters of the Ohio Valley turned hogs into light served also to reinforce and invigorate the expansion of turpentine slavery into the piney woods and the temporal super-exploitation of seamstresses that consumed so much light and life in Atlantic cities.

prepared their hogs for the impending autumn and winter sales by seeking to quickly (and efficiently) fatten hogs of between twelve and eighteen months old. “Some of these farmers drive, in one season, as high as one thousand head of hogs into their fields,” observed Charles Cist of Cincinnati, but noted that from “a hundred and fifty to three hundred, are more common numbers however.”⁴⁷

According to the historian Robert Jones, during “the spring and summer, therefore, counties such as Champaign, Darke, Mercer, Paulding, and Union supplied thousands of stock hogs to the lower Miami Valley fatteners, as did the nearby parts of Indiana. The hogs bought to follow cattle on the feedlots of the Scioto were obtained largely from the hilly counties to the east. Jackson County, for example, furnished 10,000 to 15,000 each year, and Athens and Gallia large numbers. In all three there was a comparative lack of corn together with an almost complete absence of clover pasture.”⁴⁸ The particular spatial configuration of energy, work, and power in the Ohio Valley lifescapes thus emerged through the repeated pulses of convergent movement of hogs from hinterlands to corn-rich fattening centers, long-distance movements made months before farmers, swineherds, and merchants assembled the hogs into droves bound for Cincinnati.

The majority of fatteners arranged the work and spaces of fattening in large fenced-in pens called feedlots. Feedlot owners would corral hundreds of hogs in muddy, tramped down fields, where workers would prepare and cart out vegetables and dried corn periodically to feed to the animals. It was no easy task, and required a good deal of skill and training on the part of both humans and hogs. A description of one feedlot south of Columbus clearly demonstrated how farmers continued to train and discipline their hogs in the fattening process, particularly in the sonic discipline that would be so critical for maintaining control over the hogs during the final

⁴⁷ Charles Cist, *Sketches and Statistics of Cincinnati in 1851*, 279.

⁴⁸ Jones, *History of Agriculture in Ohio to 1880*, 126.

drive to market. Feeding time was quite an elaborate ordeal. “In wheels to the hog pasture, a great heavy Dutch wagon with four stout horses,” wrote one amused traveller, “the driver astride on the near hind one, coolly whistling some animating air and keeping time with the flourishing of his whip in loud pistol cracks, while another genius, standing on top of the load, commences pitching it to the right and left, stopping and standing up now and then to give the long drawn roll-call, at the top of his voice, of whoo-oo-hoo, or perhaps more poetically from a horn slung at his side, he draws forth a clear tremulous blast that rouses the whole grunting field from their recumbent positions and sets them on the move.”⁴⁹ Feedlots, the most common mode of fattening in the antebellum Ohio Valley, were labor intensive projects designed to produce a managed chaos within spaces circumscribed by pens, whips, and sounds. Their success and desirability, however, were sharply challenged by both agricultural reformers and traditionalists.

According to the political visions of reformers, the ideal fattening camp would be a spatial configuration of labor that functioned somewhere between a factory and a plantation. Thomas Affleck, in his mission to empower, enrich, and modernize Western farmers, routinely visited and published descriptions of hog farms near Cincinnati that he felt conformed to the ideal. With close attention paid to micro-spatial arrangements, visual lines of control and management, and the precise flows of energy in a productive hog farm in October (the height of the fattening season), Affleck reported how “Mr. M. has gone to work in the right way—beginning with a good barn, good fences and good roads—his barn and stables, hog pens, &c., are rather close to the dwelling house to please the taste of many, but not too much so where the farmer intends that every thing shall be well attended to, under his own eye.” Kept within lines of sight, but separate from the sounds and smells of his human domain, Mr. M. had arranged his hog camp

⁴⁹ Quoted in Jones, *History of Agriculture in Ohio to 1880*, 125-126.

such that he could perfectly manage his hogs as they worked to transform corn into meat, where “every hog can be put in a separate pen, if necessary ... with a passage along the whole front of them direct from the cutting and steaming house, in which are two large set boilers, with hogsheads for souring food for the hogs, cooling troughs, &c.”⁵⁰

Here was an industrialized practice and vision of hog farming, a concentrated arrangement whereby raw materials (corn) were carefully selected and prepared for a captive hog labor force made to focus all its energies on the singular task of eating. “Hogs to fatten best should not know what liberty is,” advised the *Prairie Farmer*, and “they should have a warm dry bed—their feed at regular hours, and in sufficient quantities. As soon as the meal is over they then lie down and rest until the next feeding time comes round.”⁵¹ Indeed, food alone was not enough. To press their hogs into rapidly producing weight, farmers tried to construct spaces that would allow them to control and manipulate the hogs’ passage through time. Or, put differently, some farmers saw the potential to develop technologies and structures that would, as railroads did for transportation, transform the speed and ease with which their hogs moved through biologically and socially produced times, the rate and efficiency at which they converted food into weight in the seasonal landscapes of Ohio Valley farms, in both absolute and relative terms.

“ ‘In the first place, *there must be a good piggery,*’ ” wrote one exasperated farmer for the *Prairie Farmer*, lamenting that there was “ ‘a greater failure in this respect than any other. The swine are too cold in cold weather, and too warm in warm weather. The owners of these animals do not sufficiently consider that they require to be comfortable, in order to thrive and do well.’ ” It was a common complaint by reformers. Too many farmers, they believed, thought only of fodder. They seemed to forget that their hogs were living animals vulnerable to the elements, and

⁵⁰ “A Hamilton County Farm,” *Western Farmer and Gardener* 2 (November 1840): 34.

⁵¹ “Cooking for Swine,” *Prairie Farmer* 10 (October 1849): 305.

“ ‘many have hogs that are continually *scolding and crying*; not so much on account of being scantily fed, as for the want of a comfortable piggery.’ ”⁵² The same writer tried to translate the squeals of such oppressed hogs into the language of paternalism and mastery, writing lyrically that, “ ‘I went by one of these miserable pens the other night, where the inmates were whining out something like the following: Oh! cruel master, why do ye / Confine us in this piggery? / Oh! here we lie, without a bed, / Dirty and wet, from foot to head; / Borers comes in from every crack, / And bites our *ears*, our *legs* and *back*: / Thus we shiver all the night; / We *scold*, we *whine*, and sometimes *bite*. / Hard master shall it always be, / To have no *better piggery*.’ ”⁵³

And what would such a “better piggery” be? Despite the rhetorical humanization of these hogs, and the invocation of the cruelty of slavery, the answer was not, the writer concluded, freedom for the hogs, but rather that “ ‘swine ought to have a dry, comfortable nest. Furthermore, it is highly necessary that it should be so that they can bask in the sun in cold weather, and have the benefit of the air and shade in the warm. There is no doubt but a third may be saved by good accommodations.’ ”⁵⁴ Building and shaping a scientifically informed environment of barns, sheds, and pens, farmers would be able to “save” more of their hogs for slaughter. Debates ranged on whether to cover the pen (wholly or in part), whether to floor the pen with planks, or to feed hogs on the muddy ground. Conclusions varied according to conditions and number of hogs, but in each instance the terms of debate were framed as a function of the cost and speed at which a farmer could hope to convert corn into living pork.⁵⁵

⁵² “Management of Swine—Cooking Food,” *Prairie Farmer* 3 (January 1843): 13.

⁵³ “Management of Swine—Cooking Food.”

⁵⁴ “Management of Swine—Cooking Food.”

⁵⁵ “Fattening Hogs,” *Prairie Farmer* 5 (November 1845): 261; B. W. F. Stubbing, “Fattening Hogs, &c.,” *Prairie Farmer* 12 (October 1852): 472; Wm. Pettes, “Feeding Hogs,” *Prairie Farmer* 8 (February 1848): 54; Horace Clark, Jr., “Pork Feeding,” *Prairie Farmer* 9 (June 1849): 186; H. Shaw, “How Much Pork Will a Bushel of Corn Make?” *Prairie Farmer* 8 (January 1848): 11.

Like slaveholders who reproached others not for their ownership, domination, and exploitation of human beings, but for their “cruelty,” loss of patience, and deviation from the idyllic paternalistic vision of a plantation “household,” this writer envisioned a more moral hog lifescape, a corollary “husbandry” to the plantation’s paternalism.

Again, this was not to save the hogs from death, but to save them from “nature,” to make sure they died in the right place at the right time so that their lifework would have social value for the farmers. The tension was not so much between cruelty and kindness as it was the contradiction between working hogs in life and preparing and accumulating value in hogs for death. As one farmer noted in a particularly clarifying example of the violence of economic attitudes towards life, “an idle hog will make 12 pounds of pork as easily as it will make 8 pounds if the animal is allowed to exercise his natural propensity to root. In this we entirely agree, and have often contended that when a hog is shut up to fatten, if he was confined in a slip so narrow that he could not turn round, having one side of his narrow prison made so as to be moved out as he increased in bulk, he would fatten faster than in any other position.”⁵⁶ Here, then, was a prescient vision of a carceral future of industrialized farming that has become our present, a world in which the logic of holding property rights in the bodies of living non-human labor was played out to its natural conclusion.

It should be noted, however, that the class of farmers advocating further enclosing, imprisoning, and reducing their hog herds into pure pork manufacturers was only one class, even among those raising their hogs for the Cincinnati and Louisville markets. Contained in each Ohio Valley hog was a contradiction between its social value as a general, unskilled laborer, and its social value as a skilled (pork-producing) laborer. Instead of hiring field hands to harvest, and

⁵⁶ Solon Robinson, ed., *Facts for Farmers*, 24.

transport corn, and paying for a mill to grind it, many large farmers simply turned their hogs into a cornfield to harvest and consume it themselves onsite. Fattening in the field, or “hogging down a cornfield,” was an old practice, but one that antebellum farmers, especially those skeptical of more industrially minded reformers, continued to pursue and adapt in a changing geography of life and labor.⁵⁷

While it may have saved (human) labor, field fattening still required careful management and timing in order to take full advantage of the combined lifework processes of hogs and corn, to capture and contain the most energy and matter in the commodified form of living pork. “The earlier in the season the process of [field] fattening swine is begun the better,” recommended one farmer in Solon Robinson’s *Fact for Farmers*, for “after the grain has reached a certain period of maturity, whether it be rye, oats, or corn, because all farm animals, and hogs in particular, will fatten much faster in warm than in cold weather.” Nor was the weather the only temporal process determining the times and spaces of fattening. Aligning the growth cycles of corn with the metabolic work of hogs was equally crucial, for “the grain between the periods of its doughy state and full maturity, or rather, before it becomes dry, is more easily digested, and assimilated, and converted into flesh and fat than when it has passed into its dry state. It is clear, then, that the sooner the hogs are turned into the field after the grains of corn are fully formed, and while yet in the milk, the more speedily they will fatten; for if the weather be dry, the corn hardens very rapidly.”⁵⁸ According to one farmer, there were three main reasons for fattening hogs in the field: “one was to save the labor of gathering and hauling the corn; the other was that it cleared the field for wheat sowing. Another advantage, by no means negligible, was that it furnished the

⁵⁷ Jones, *History of Agriculture in Ohio to 1880*, 125-126.

⁵⁸ Solon Robinson, ed., *Facts for Farmers*, 28.

ground a good deposit of fertilizer.”⁵⁹ Using moveable fencing to guide this work, farmers thus aligned, navigated, and reconfigured several biological, seasonal, and economic cycles by field fattening.

Edmund Cody Burnett later recalled how this field fattening worked in practice. “The device was to cut off part of a cornfield with a temporary fence and just turn the hogs into this lot to feed at will,” he wrote, demonstrating again the critical role of moveable fencing in shaping and dividing the work of land and life on hog farms. “The size of the lot,” he continued, “would depend on the number of hogs, for the amount of corn had to be just about what the hogs would clean up in a week or ten days. Corn left lying on the ground longer than that would sour. As soon as one lot was cleaned up another would be fenced off and so on till the whole field had been eaten down.”⁶⁰ The hogs may have done the work, but it was the fences that made the workscape, and their production and maintenance was closely and dearly attended to. “My father once bought from Russell Jones, who lived at the foot of Round Mountain,” Burnett recollected, “several hundred rails made of young chestnut trees, expressly for this purpose. When the fattening season was over, these rails were carefully stacked up until the next season. We had plenty of timber for oak rails, but oak was heavy and prone to warp. For a good many years these chestnut rails were religiously kept for this special purpose...”⁶¹

Within the chestnut rails, the actual work of “hogging down a cornfield” took place in remarkable fashion. Remembering late summer days spent overseeing the fattening hogs, Burnett described a contested division of energy and labor between large and small hogs in which “the smaller hogs trotted around or wandered about, searching for fallen ears of corn or for leaning

⁵⁹ Burnett, “Hog Raising and Hog Driving in the Region of the French Broad River,” 95.

⁶⁰ Burnett, “Hog Raising and Hog Driving in the Region of the French Broad River,” 95.

⁶¹ Burnett, “Hog Raising and Hog Driving in the Region of the French Broad River,” 95.

stalks that they could easily bring down.” Big hogs, on the other hand, followed a very different practice than their smaller, scavenging brethren. A large hog “would stride up to a standing stalk, put his nose against it, give it a gentle shake, and would know at once whether the stalk carried a light ear or none at all. If he felt weight up there, he would push hard with his nose, and if that did not bring down the stalk, he would rear up on his hind legs, put his fore feet against the stalk and push and shake it till it came down. ... I imagined that the little hog, unable to knock down a big heavy stalk by himself, felt grateful to his big brother, who having got his own bellyful, moseyed off to the shade, leaving parts of ears unconsumed.”⁶²

Within the fences, cornstalk by cornstalk, ear by ear, hogs worked with and against each other in a struggle that rapidly transferred the energy of corn into the portable commodity-form of living pork. It was a labor process that produced pure surplus value for the farmers who owned the means and products of lifework, and many sought to clearly demonstrate and measure this fact. In one “experiment” republished by Solon Robinson, a moveable fence was used to confine 189 hogs, weighing an initial 19,600 lbs. “to an area sufficient to afford feed for two or three days. The entire field, thus fed, contained 40 acres, with an estimated average of 40 bushels per acre. The consumption of this corn gave a gain of 10,740 lbs. The hogs, when turned into the corn, cost three cents per pound, equal to \$588; worth, when fed, four cents per pound, or \$1,213 60—giving a return for each acre of corn consumed of \$15 64. Adding to this \$1 per acre for the improvement of the land by feeding the corn on the field, making the actual gain per acre \$16 64, equal to 40 cents per bushel standing in the field. The whole cost of corn per acre, exclusive of interest on the land, is set down at \$3 65.”⁶³ As farmers made their hogs fatten themselves in the field, the hogs thereby reproduced the very conditions for their captivity. Producing value in both

⁶² Burnett, “Hog Raising and Hog Driving in the Region of the French Broad River,” 95-96.

⁶³ Solon Robinson, ed., *Facts for Farmers*, 28.

their own flesh and in the land, these fenced-in hogs ate, shat, and maintained the means of their and future hogs' imprisonment in life, while drawing themselves, pound by pound, ever closer to the exchange that would end in their violent deaths.

For industrial hog farmers and their promoters, there was perhaps no greater preoccupation than determining the best way to fine tune and perfect the means of pork production. Primarily, this concerned the problems of how best to prepare corn and how best to select and prepare the right breed of hog. In an article entitled, "Making Pork—Cooking Food for Animals," republished from the *American Farmer* by Thomas Affleck in his *Western Farmer and Gardener*, the author summarized the problem as he saw it: "In the first place, but little attention, if any, is paid to the kind of hog used for feeding. It is enough, if the animal, caught and caged in the pen, is a hog; the fact that a given quantity of food fed to some breeds will make nearly or quite as much again pork as when fed to some other breeds, is overlooked; and an astonishing quantity of roots and grain is thus annually wasted. In the second place, the mode of feeding is very defective. The food may be good, but if given to the hog unprepared, or uncooked, much of its efficiency is lost."⁶⁴

Corn was not the only grain or foodstuff that farmers fed to hogs, but for reasons related to economy and nature, it was by far the most important. One reformer wrote of the hidden profit in corn, unleashed by cooking and feeding to hogs, that "the value of corn meal for making pork, it has been shown by experiment, is almost doubled when made into pudding." At the beginning of the fattening process this farmer mixed ground, steamed corn meal with apples, pumpkins, and other roots and vegetables. But as "the feeding progresses, the quantity of meal is

⁶⁴ The American Farmer, "Making Pork—Cooking Food for Animals," *Western Farmer and Gardener* 2 (December 1840): 61.

increased, until towards the last, that material alone is used. Corn is decidedly the best grain for making pork; peas and barley are next...”⁶⁵

Indeed, the phrasing “making pork” spoke volumes. These were not self-styled independent subsistence farmers, but market-oriented manufacturers of a living commodity. Unlike many other industrial capitalists, however, for these farmers the larger part of their labor force was also the technological means of production and the product itself. As such, transforming the accessory technologies and processes operated by humans to prepare corn (the raw material) for the hogs (the main production process) held the greatest potential for increasing the production of surplus value. “I am about to try Bogardus’ mill,” wrote one enterprising hog raiser to the *Prairie Farmer*, “which, it is said, will, with two horses, grind three hundred bushel of corn and cob in a day. I further design to fix the mill so that the meal will fall into a tub or vat, where the grist, (corn and cob,) can be cooked by steam, supplying the boiler and tub with water from a spring, making the mush just thin enough to run from the tub into troughs, thus avoiding all labor in drawing water or carrying the food.”⁶⁶ This was particularly important for western farmers with their more sizeable herds of hogs. “We know it is a very different business for a western farmer to fat his two or three hundred hogs from what it is with an eastern one with his ten or twenty,” wrote another prairie hog farmer. Some might have scoffed at the notion of cooking food for such enormous number of hogs, but “there is great economy in doing it, and saving expense is as important to the prairie farmer as any other. We have never heard of one who had practiced cooking for his animals, either by steam or boiling, who did not commend it

⁶⁵ The American Farmer, “Making Pork—Cooking Food for Animals.”

⁶⁶ “Cooking for Swine,” *Prairie Farmer* 10 (October 1849): 304.

for the economy; and the testimony being so conclusive, and there being no counter evidence, it appears to us farmers should regard it.”⁶⁷

These boiler systems not only looked modern; they displaced both human labor (carting, shelling, distributing corn) and hog labor (chewing, breaking down corn into its absorbable components). They also made the central labor process of transforming corn into pork far more legible to scientific farmers. An entry in Solon Robinson’s *Facts for Farmers*, entitled, “Corn and Pork—How much Pork will a Bushel of Corn make?” was a case in point. As the author exasperatedly and condescendingly asserted, “This is one of the most important questions that can be asked by every man who raises a bushel of corn or feeds one to a hog. Yet it is a question that not one in ten can answer. To see the ignorance of mankind upon subjects of most importance to them, makes us ready to exclaim, Does anybody know anything about anything?”⁶⁸ Following this denunciation of agricultural “ignorance,” the author listed many farmers’ experiments, with results ranging all over the place, focused on how much pork a hog could make with corn fed on the ear, with dried corn, ground corn, shelled corn, and, of course, cooked and boiled corn. Hogs were the laborers and labor process, but for most farmers, they remained veiled in mystery; reformers like this writer were trying to uncover the biological knowledge of their pigs and transform it into an economic knowledge more legible to, and compatible with, the dictates of capital.

William Renick of Circleville, Ohio, a large hog farmer, felt that this new obsession with precisely measuring “how much pork a bushel of corn will make” was misplaced, and the supposed ignorance of farmers greatly exaggerated. “ ‘Probably nine tenths of our best practical farmers could, without hesitation, give you an approximate answer in general terms.’ ” For Solon

⁶⁷ “Management of Swine—Cooking Food,” *Prairie Farmer* 3 (January 1843): 13.

⁶⁸ Solon Robinson, ed., *Facts for Farmers*, 19.

Robinson, on the other hand, this was exactly the problem. Approximate answers in general terms were not good enough. “It is all guesswork,” he complained, demanding that farmers bring science to bear on their industry.⁶⁹ But by railing against farmers’ ignorance of the arithmetical conversion rate of corn into pork, reformers like Robinson did more to reveal their own obsessions with making agriculture appear scientific and operate according to the same principles and methods as industrial manufacture than they did to prove the idiocy of hog farmers. The outspoken reformist visionaries of the hog lifescapes highlighted the fact that farmers were far from a monolithic class, with different classes of farmers and agricultural reformers espousing and adhering to divergent ideologies (and needs) in relation to “scientific” agriculture.

This campaign to produce precise, scientifically determined knowledge of hog metabolisms may not have been greeted everywhere with the same enlightened verve that reformers shared and expected, but their experimentations and discourse did provide a detailed window into the practices and preoccupations of at least one successful class of hog farmers. Samuel H. Clay, a large hog farmer in Bourbon, Kentucky, reported that he had “been experimenting in feeding several lots of hogs, changing them from raw to cooked, and from ground to unground food, with the following results: One bushel of dry corn made 5 lbs. 10 oz. of live pork; one bushel of boiled corn made 14 lbs. 7 oz., in another nearly 18 lbs. of pork.” This was farming as change in mass, agriculture articulated in the language of physics and chemistry. But what ultimately concerned farmers was translating biology into economy, and so even more important than the finding the conversion rate of corn into pork, was how this could be represented in monetary terms. “To get the value of corn,” concluded Bourbon, “estimate the pork at 8 cents a pound; we have as the result of one bushel of dry corn, 45 cents’ worth of pork;

⁶⁹ Solon Robinson, ed., *Facts for Farmers*, 22-23.

of one bushel of boiled corn, 115 cents' worth of pork; and of one bushel of ground corn, 136 cents' worth of pork."⁷⁰ This insistence on calculating and manipulating the "productivity" of corn was, in two important senses, an attempt to measure and increase the labor power of hogs. First, such practices further entrenched a vision of hogs as skilled pork manufacturers. Second, these farmers were experimenting and fine-tuning the process of converting money into more money through corn and pork, were waging corn to increase the expropriation of the surplus value of *life* from their hogs.⁷¹

The Death March

Moving the hogs from farms to slaughterhouses, from the spaces that had made and raised them in life to the spaces that would unmake them in death, was no small feat. Nor was it simply a spatial translation; the march of the hogs was as fundamentally a temporal process as it was a spatial one. It was, on a biological scale, a forced migration of living organisms fighting

⁷⁰ Solon Robinson, ed., *Facts for Farmers*, 25.

⁷¹ It does not require much of an imaginative leap to see the strong parallels with how farmers fed and thought about feeding hogs and how planters fed and thought about feeding slaves. That does not mean that hogs and slaves were the same. Humanists have rightly avoided drawing any kind of equivalence between animals and slaves, insisting strongly in the humanity of slaves. And they are right. Slaveholders were wrong. But we must do more than insist on enslaved humanity when slaveholders and farmers, at least in some circumstances and from certain perspectives, insisted so strongly that slaves and animals were *not* different, that they were both just so much flesh and bone and sinew, that they were both functions of fodder. The ease with which Thomas Affleck transitioned from an expert on feeding, breeding, and raising hogs to an expert on managing the provisioning and working of slave plantations is evidence not that hogs and slaves were the same, but that the political economy of owning people and animals relied on broadly similar techniques of domination, maintenance, and exploitation. We need to find ways to see the practices of slavery in livestock farming and the practices of livestock farming in slavery, cross-pollinating one another even as they remained imperfectly distinct. Take, for instance, this passage from Frederick Douglass's famous slave narrative: "Our food was coarse corn meal boiled. This was called *mush*. It was put into a large wooden tray or trough, and set down upon the ground. The children were then called, like so many pigs, and like so many pigs they would come and devour the mush; some with oystershells, others with pieces of shingle, some with naked hands, and none with spoons. He that ate fastest got most; he that was strongest secured the best place; and few left the trough satisfied." Were slaves being treated as hogs, or were the hogs we have seen being treated as slaves? The answer is almost definitely that both were true. But what is truly important, especially for historians of animals and agriculture seeking to make political arguments involving nonhuman actors, is that we find ways to ask that question without allowing ourselves to fall into the trap of equivalence. [Frederick Douglass, "Narrative of the Life of Frederick Douglass, an American Slave" (1845), in Frederick Douglass and Harriet Jacobs, *Narrative of the Life of Frederick Douglass, an American Slave & Incidents in the Life of a Slave Girl* (New York: Modern Library, 2004), 40.]

against the loss of meat and fat from exertion and sometimes hunger. At the scale of the terrain, the march passed over and through upwards of hundreds of miles of roads, rivers, and rail—each transportation network shifting with and against the others on seasonal tides of mud, rain, ice, and thaws. Measured in calendar time, it was wedged between the start of November and the end of January. Shaped by market tides and cycles—a different kind of social time—the drive was liable to irregular spikes and dips in the speed and volume of traffic as changing prices for pork and corn encouraged farmers and drovers to hold hogs back on farms or push them out onto the trail. The march wound in and through a temporal topography of friction, a contested passage annually reiterating and reorganizing the time and spatial discipline of the Ohio Valley as drovers forced hundreds of thousands of hogs between spaces of life and spaces of death.⁷²

With the autumn harvest drawing to a close in the antebellum Ohio Valley, hogs, men, and market rumors were set annually into motion across the landscape. “When we read that about 18,000 hogs were driven from Marion County in 1845, about 40,000 from the Chillicothe vicinity in 1847, and similar numbers from other defined areas,” noted one historian, “we realize that getting the animals from place to place and from owner to owner must have furnished employment for a small army of drovers and helpers.”⁷³ Finished in the fields, farm hands looked to follow the hogs they had helped raise on their journey to Cincinnati. As one Kentucky author described in 1856, each year “hundreds of hogs were purchased miles away, and taken to Porkopolis in droves, on foot. This was practiced to such an extent that hog driving in the Fall of the year became a regular business, and many were the farm hands who annually calculated on

⁷² In 1833, 85,000 hogs were packed in Cincinnati. In 1835, that number leapt to 162,000. In 1848, it leapt again to 475,000, and for the next 15 years ranged from an annual low of 334,000 in 1851 to a high of 608,457 in 1863. Cincinnati Chamber of Commerce, *Annual Report of the Cincinnati Chamber of Commerce and Merchant's Exchange, for the Commercial Year Ending August 31, 1866* (Cincinnati: Gazette Steam Printing House, 1866), 60.

⁷³ Jones, *History of Agriculture in Ohio to 1880*, 127.

buying a new ‘rig out’ for the Winter, with the receipts of a ‘drive’ to Cincinnati behind a lot of porkers.”⁷⁴ Another stylized account presented by the same author, told the story of such a hand. “ ‘The drovers bought our hogs an’ they offered me two bits a day an’ found, to help drive them to Cincinnati,’ ” recalled the narrator of the story. And because he “ ‘hadn’t nothin’ special to do,’ ” with the end of the harvest leaving him with some free time, “ ‘an’ thinkin’ it war a good time to go to town and see city sights, I took ’em up, put on my best wamus, my cow-hide boots, an’ started.’ ”⁷⁵

Assembling Drovers

Drovers were assembled in the pork hinterlands of Cincinnati by two main processes. As the *Cincinnati Gazette* observed in 1843, in “Kentucky, the drovers frequently buy the hogs alive of the farmers by gross weight, as is sometimes the case in Ohio and Indiana. But generally the farmers club together (each one having his hogs marked) and drive them to market themselves in droves of 500 to 1,000, and seldom less than 500, except in the immediate vicinity of the city.”⁷⁶ Sometimes based on prior contracts, sometimes on speculation, drovers fanned out across the countryside purchasing or collecting hogs from smaller farmers (those with up to one hundred hogs for sale), until the droves reached anywhere between five hundred and three thousand hogs, with most being around one thousand.⁷⁷ As drovers gathered their droves, which might take place over a few weeks, they often rented fields in the area to help them more effectively and securely navigate the unpredictable changes in weather, roads, markets, and deliveries by farmers.

⁷⁴ “The Hog Drover’s Visit: Or, Bill Jenkins’ First Impressions of the Queen City,” in *Green Peas, Picked from the Patch of Invisible Green Esq.* (Cincinnati: Moore, Wiltach, Keys & Overend, 1856), 136.

⁷⁵ “First Love: Or, Jeremiah Triumph’s Opinion of City Gals,” in *Green Peas*, 69-70.

⁷⁶ “The Pork Trade of Cincinnati,” *Farmer’s Magazine* 8 (October 1843): 264.

⁷⁷ Jones, *History of Agriculture in Ohio to 1880*, 128-129; Charles Cist, *Sketches and Statistics of Cincinnati in 1851* (Cincinnati: Wm. H. Moore & Co., 1851), 279; “The Pork Trade of Cincinnati.”

This way, drovers could afford to assemble their droves piecemeal, purchasing a supply of recently harvested corn to maintain already-fattened hogs at around 200-300 lbs. until they had accumulated sufficient numbers, or until a change in the weather or market made a drive more attractive.⁷⁸ Another strategy was for drovers to buy up stock hogs of only 100-125 lbs., and then “having bought in some convenient locality in the district, a standing field of Corn, into which all the stock hogs purchased in the neighborhood are driven, the hogs tear down the stalks and Corn and are thus self-fattened.”⁷⁹

Generally, drovers made their purchases on credit borrowed from banks in notes due in sixty to ninety days, which conveniently matched the duration of the packing season, just enough time for farmers and drovers to turn hogs into droves into pork into cash.⁸⁰ They bought the hogs as they were to be sold, by total weight of the drove, priced at a rate of either per pound or per one hundred pounds, with both the average weight of the drove and the individual weights of hogs also supposed to fall within established parameters. The exchange of hogs between farmer and drover, then, was not some quick paper transfer of money and property rights, but an involved process featuring scales, detailed accounting, and herding, hoisting, and carefully marking hundreds of individual hogs. The historian Robert Leslie Jones described how this was supposed to play out in practice, when “a firm of drovers received and paid for 1,247 hogs one day in early 1861 at Corwin in Warren County. As the hogs were assembled, they would typically be weighed, on a stock scale when one was available, otherwise suspended one by one in

⁷⁸ Jones, *History of Agriculture in Ohio to 1880*, 128.

⁷⁹ “The Culture of the Hog,” *Gallipolis Journal*, January 12, 1854, 1.

⁸⁰ Jones, *History of Agriculture in Ohio to 1880*, 128-129.

a sling on the arm of a steelyard fastened to a limb or an overhead beam. They would then be marked with paint for identification.”⁸¹

Of course, such market exchanges did not always proceed so smoothly. In the fall of 1836, the hog farmer William C. Cowan drew up a contract with his neighbor, a drover named James F. Mason, for delivering hogs the following year. “This writing is to show that James F. Mason has bought of Wm. C. Cowan all the hogs that he may have for market, next fall; to be delivered about the 25th or 10th of October. The lot of hogs are to average two hundred and fifty pounds, and be in number, about one hundred, more or less, at the price of five dollars per hundred pounds, gross, payable in ninety days after delivery, the paper well indorsed. It is further understood that no hog is to weigh less than two hundred, gross.”⁸² With such a contract between them, William Cowan and James Mason had paved a secure and private future avenue from Kentucky farm to Cincinnati market, an avenue through which hogs could be driven to generate a guaranteed exchange relation between the two men impervious to the fluctuations of market prices, or the contingent circumstances of the terrain. But while this market route—like the hundreds of other contracted trades directly linking farmers and drovers, drovers and packers, or farmers and packers—remained protected from the market by the power of contract, it was not without risks, and Cowan and Mason had contradictory reasons for wanting to actually see those hogs follow this path. According to later court testimony, “on the 17th or 18th of October, the parties met by agreement, at the house of Cowan, for the purpose of weighing, marking, and setting apart the hogs that were to be received by Mason.” As they began measuring, aggregating, and dividing “the stock hogs of Cowan, that had been prepared for market,” however, “it was discovered that there were only ten or eleven, of the whole number, that came up to the average

⁸¹ Jones, *History of Agriculture in Ohio to 1880*, 128.

⁸² *Mason v. Cowan’s Administrator*, 1 B. Mon. 7 (Ky. Ct. App. Oct. 14, 1840).

stipulated by the contract. Thereupon, the weighing was discontinued by Cowan, and Mason went home.”⁸³

Guaranteed though this market path was, for William Cowan to successfully access it, for it to be transformed from an imagined future into a materially present space, he had first to raise and deliver hogs meeting certain requirements. He failed. His hogs were too skinny; he had been too frugal with feeding them. Likely breathing a sigh of relief, James Mason felt free to dissolve the contract and go about purchasing hogs at the considerably lower current market price of \$3.12½ per cwt. It should be noted that while there was no suggestion in subsequent court proceedings that James Mason had deliberately under-weighed William Cowan’s hogs, the pressures to cheat one’s way out of a suddenly burdensome contract were undeniable. And this was just as true in the reverse—gaming one’s way in (or back in, as it happened) to an advantageous contract was part and parcel of the veiled politics of the hog trade. Indeed, for William Cowan, that glittering path of profit had not yet wholly disappeared. Desperate to make up for his failure to produce enough hog flesh through his own farm, William Cowan sought to remedy the situation through the magic of the market. After James Mason gave up weighing the unimpressive lot of hogs and left the farm, William Cowan promptly sought another drover moving through the neighborhood “who had about one hundred hogs, of large size and heavy weight,” and made an arrangement with the drover “by which he was to have so many of his hogs at four dollars, as would bring up forty nine of his own stock hogs to the average and make up the hundred, in case Mason received them, and if he did not, then the drover was to take them back at the same price, and receive pay for the trouble of weighing.”⁸⁴ If it worked, it would be a brilliant move. In buying fat hogs at \$4 per 100 lbs. to raise his skinny drove to the

⁸³ *Mason v. Cowan’s Administrator*, at 7-8.

⁸⁴ *Mason v. Cowan’s Administrator*, at 8.

contracted higher *average* weight and selling those hogs for the contracted \$5 per 100 lbs., William Cowan would make a profit of hundreds of dollars, and without having fattened the pigs himself. Cowan hoped to effectively (and immediately) fatten his hogs by inflating their average weight.

Unfortunately for William Cowan, however, James Mason (and later, too, the courts) rejected the legitimacy of this kind of market production. Cowan drove forty-nine of his original hogs together with all one-hundred of those he had bought from the drover to Mason's, but Mason "refused to receive them, and the hogs stipulated for with the drover, were re-delivered to him at the same price, and the forty nine sold to him, at three dollars and twelve and one half cents, per hundred, and all driven by him to market. Hogs had fallen from five, to about three dollars and twelve and one half cents, in the fall of 1837."⁸⁵ In the court decision, it was determined that because William Cowan had not raised and fattened the drover's 100 hogs, he could not sell them to James Mason as part of their contract. The only path into such a secured price-avenue to market was to undertake (or oversee) the work and risk of raising and fattening hogs himself.

The collapse and contest over the contract between James Mason and William Cowan revealed some of the stakes and politics of droving, but the outcome of that politics usually had different outcomes. By strategically forming and holding contracts, some actors were able to exert considerable control over and capture enormous wealth from the geography of the droves. Observing an incoming drove on his journey out of Cincinnati, Frederick Law Olmsted was accompanied atop the wagon box by "two Kentuckians, bound homewards." Striking up a conversation with his companions, they told him that, "from the brand," many of the hogs "belonged to Mr. Clay—Cassius—who buys them of farmers, and has them driven to market.

⁸⁵ *Mason v. Cowan's Administrator*, at 8.

He made, they understand, \$40,000 the previous year, in this business.” There was, however, some disagreement about how he would fare that year: “‘Well, he’ll lose money this time,’ said one. ‘No,’ said the other, ‘he has sold them all, beforehand. They’re all contracted for. He’ll make another \$40,000 this year, I shouldn’t wonder. I know of one man myself who has paid him \$2,000 to be let off from his engagement.’”⁸⁶ Cassius Clay, sensing (or guessing), better than James Mason had, the future shape of the hog trade, used contracts to enclose hogs and farmers in a market geography of his own making. And as the general price of hogs rose, at least one farmer was willing to pay thousands of dollars to escape that enclosure with his hogs and seek an alternative path to Cincinnati.

The Spatial Politics of Drovers

The actual journey from farm to slaughterhouse, however, was a continual reminder that the market geography through which money was exchanged was never more than a kind of fiction, a promise and a hope cloaked in the confident certainty of contractual prose. The march itself was long, arduous, and unsure. For the hogs, the transition into a drove was abrupt and exhausting. Some of the “wilder ones” fought so hard to resist that drovers would stitch their eyelids shut before starting on the road.⁸⁷ And even once the drove got marching, hogs continued to cause trouble by refusing to move, or trying to wander off. “It is no light job to trudge over a muddy road, day after day,” recounted one Cincinnati writer, “urging on the hogs continually with a whip or a switch, yelling ‘so-boy’ constantly at the top of one’s voice, now running like all fury to head a spry hog, which has taken a notion to go the wrong road, and again helping a lazy

⁸⁶ Olmsted, *A Journey Through Texas*, 11-12.

⁸⁷ Jones, *History of Agriculture in Ohio to 1880*, 129.

fellow along, by wrapping his tail around one's hand, and giving him a boost with the knee and arm together.”⁸⁸

Through a combination of pain, sonic discipline, and conditioned vocal commands, drovers attempted to manipulate the memories, fears, and instincts of the hogs into a system of power and control over the animals' movements. It was a spatial struggle that could be heard for miles. “As soon as a drove came through the gap in the ridge about a half mile distant across the river,” recalled Edmund Cody Burnett, “we could hear the ‘ho-o-o-yuh! ho-o-o-yuh!’ of the drivers, and sometimes we could hear the crack of their whips.”⁸⁹ Part of the reason for these practices had to do with the natures of the hogs, and their conditioning to sounds (and violence) in the pens. But perhaps an even more important factor was that these practices and relations had to extend past sundown, when drovers' visual power reached its limits. Burnett remembered well one night “when a drove was overtaken by darkness 2 miles or more from the ferry,” and he “could hear an unending stream of ‘ho-o-o-yuh! ho-o-o-yuh! ho-o-o-yuh!’ mingled with the resounding crack of the whips, as the drivers sought to prod the weary hogs a little farther, a little farther, to where they could be lotted and fed.”⁹⁰

Pushing hogs through day and night, from station to station, and meal to meal, the hog driver's command was his power and his living. “If you have never heard the hog driver's word of command, and probably few of you ever have,” wrote Edmund Cody Burnett, “you should know that the first syllable is like a prolonged wail, while the last syllable is hurled out with a snap and a thud, much like the exclamation one might make if suddenly hit in the solar plexus. At nightfall the voice of the driver and the crack of his whip were probably necessary to keep the

⁸⁸ “The Hog Drover's Visit: Or, Bill Jenkins' First Impressions of the Queen City,” 136.

⁸⁹ Burnett, “Hog Raising and Hog Driving in the Region of the French Broad River,” 90.

⁹⁰ Burnett, “Hog Raising and Hog Driving in the Region of the French Broad River,” 90.

hogs moving, but I always had a notion that in daytime it was mostly the driver's way of keeping himself company."⁹¹ Whether with voice or whip, drovers knew that their work and power was a thing of sound, and while not "every driver took pride in his voice, though some of them seemed eager to start the echoes from the nearby hillside," according to Burnett, "every driver seemed to be proud of his whip." Knowing how to use and master these whips took considerable skill. As Burnett observed, the drover's whip "had a short stout stock, wound artistically with a leather strap, and a long plaited leather lash terminating in a cracker, a narrow strip of tough leather. A skillful manipulator of the whip could not only make it talk with a resounding thwack but could produce a pretty good imitation of a clap of thunder. There is no room to doubt that a combination of the driver's voice and whip impelled a lazy sluggish hog to quicken his pace."⁹²

Indeed, "lazy" hogs seemed to be the bane of a drover's existence. "That black, spotted critter raised by 'Squire Sidebottom, was so lazy that we had to wollop him every step. He's a plaguey ill-mannered hog, and I came mighty near being the death of him afore we got half way thar," complained one account.⁹³ Another hog drover reminisced to a WPA interviewer of how exhausted animals could determine the labor and pace of droving: "Two of us walked at the front, on either side of the herd, to keep it pointed in the proper direction, and the other fellow stayed in the rear to poke a hog that became tired and lie down, then we would wait until they had their rest out, before going on."⁹⁴ With whip, prod, and shout, drovers prided themselves on getting the hogs up to speed. The first few days were the hardest according to the *Cincinnati Gazette*, during which "the hogs cannot well travel more than four to six miles; but after that they travel

⁹¹ Burnett, "Hog Raising and Hog Driving in the Region of the French Broad River," 90.

⁹² Burnett, "Hog Raising and Hog Driving in the Region of the French Broad River," 92.

⁹³ "The Hog Drover's Visit: Or, Bill Jenkins' First Impressions of the Queen City," 137.

⁹⁴ Charles W. Holden Interview, Library of Congress, Manuscript Division, WPA Federal Writers' Project Collection: <http://hdl.loc.gov/loc.mss/wpalh3.34060718>.

eight and sometimes ten miles per day, depending upon the condition of the roads. The Yorkshire are said to be the best travellers.”⁹⁵

While the drovers blamed the hogs for being lazy, it may also have been that they were simply fat and weak, a condition that was no accident. The contradictions between the processes of droving and of selling hogs meant that the best hogs for market—that is, the fattest ones, especially the ones fattened the quickest—were also the worst on the trail. One story recounts how fat hogs could thwart even the most experienced of drovers. According to the author, a famous drover was attempting to sell one half of his drove to an interested buyer, and so “the whole number were driven to the bridge, and as he was a man of energy and despatch, the hogs were put into quick motion and passed over in a hurry. The drover stood at the centre, counting the van of the drove as they hurried by, and when one half had gone past he headed the rest... It so fell out that the best runners got through first, and all the heaviest and fattest hogs remained on the drover’s side as *cullings*, of course, greatly to his *disadvantage*.”⁹⁶ The fat hogs, worth more in market, had been too slow to actually make it there.

Commentators on the trade were certainly aware of this contradiction, and devoted considerable discussion to how to resolve it. The most popular solution seemed to be in finding and making a more perfect breed of pig. Some favored Yorkshires, others Woburns, but none received more attention in the 1840s than the Berkshire hog. According to one Cincinnati pork packer, Berkshire hogs could overcome the contradictions between farmers, drovers, and packers through their superior biology, finding “them equally advantageous to the farmer and drover, as to the pork packer. Prolific and easily kept; maturing early and fattening kindly to as great weights as were desired; stamping their character strongly on any other breed with which they

⁹⁵ “The Pork Trade of Cincinnati,” *Cincinnati Gazette*, n.d., in *Farmer’s Magazine* 8 (October 1843): 264.

⁹⁶ “More Pork Stories,” *Cincinnati Miscellany* 1 (February 1845): 135.

might be crossed; and travelling well to any reasonably distant market.”⁹⁷ Another article told of how a group of Berkshires “were sold to a drover at 3 cents per lb. gross, and were so very fat, that many supposed they could not be driven to market—but they travelled well, and all arrived at Madison, about 100 miles, in safety.”⁹⁸

Some may have been skeptical, but Thomas Affleck was determined to marshal evidence and testimonials of the Berkshire’s prowess, or, at the very least, to convince his readers of the reality and import of scientific breeding.⁹⁹ Reprinting one such testimonial from a Cincinnati pork packer, the journal allowed that it “has been a prevailing opinion amongst farmers and hog raisers, that the Berkshire hog will not stand travelling, any great distance, when fat; and from hearing it so constantly insisted upon, I thought probably that such might be the case.” However, the letter continued, “when the thing is tested, I find it is, in a great measure, a mistake.” Having just finished “cutting and packing a lot of 1280 hogs, for friends of ours in Kentucky,” the packer inquired with the owners, “who superintended the driving of the animals themselves.” He found that the drove covered “a distance of at least 60 to 70 miles,” and, more importantly, that there “were several half-blood Berkshires in the drove, and they were amongst the largest and fattest in the lot, which was a superior one; and these half-breeds stood the journey much better than any

⁹⁷ John Mahard, Jr., “Medium sized, versus Large Hogs,” *Western Farmer and Gardener* 2 (July 1841): 230.

⁹⁸ J. S. W., “Berkshire Hogs,” *Western Farmer and Gardener* 2 (June 1841): 200.

⁹⁹ For more on the breeding of hogs, and especially the relationship of breeding to attempts to move hogs through the processes and spaces of life faster and more efficiently, see: “A Hamilton County Farm,” *Western Farmer and Gardener* 2 (November 1840): 35; “Portrait of Oteco.—Colour of the Berkshires,” *Western Farmer and Gardener* 2 (December 1840): 49; Thomas Affleck, ed., response to letter to the editor, Hamilton Co., OH, Nov. 26, 1840, *Western Farmer and Gardener* 2 (December 1840): 58; Thomas Affleck, “Imposition,” *Western Farmer and Gardener* 2 (January 1841): 93; “Berkshire Hogs,” *Western Farmer and Gardener* 2 (February 1841): 112; “Portrait of Reading. The Warren County Breeders, and Their Stock,” *Western Farmer and Gardener* 2 (April 1841): 153-154; J. S. W., “Berkshire Hogs,” *Western Farmer and Gardener* 2 (June 1841): 199; “Hogs, again!! Dr. Martin’s Banter Pigs—His Woburns and White Berkshires,” *Western Farmer and Gardener* 2 (June 1841): 212; “Another chapter on Berkshires,” *Western Farmer and Gardener* 2 (July 1841): 222-224; John Mahard, Jr., “Medium sized, versus Large Hogs,” *Western Farmer and Gardener* 2 (July 1841): 229-231; “The Pork business at Cincinnati,” *Western Farmer and Gardener* 2 (July 1841): 233; “Cooking for Swine,” *Prairie Farmer* (October 1849): 305; B. W. F. Stubbing, “Fattening Hogs, &c.,” *Prairie Farmer* 12 (October 1852): 472.

of the others.” In fact, some of the hogs had not even survived the journey, as “many of the common hogs gave out by the way and were left, while the others,” those Berkshire half-breeds, “the gentlemen remarked, ‘were in front the first day and the last day’—not one of them gave out, but all got here in fine order.”¹⁰⁰ The fact that all of the Berkshires arrived alive was considered a remarkable event tells us something important about the difficulty, deadliness, and carceral limits of these drives. Not only might a fat hog lose weight, but a drove commonly lost hogs, sometimes to death, sometimes to injury, and sometimes to escape.

A law amended in Illinois in 1845 was clear evidence that the boundaries and fictions surrounding the movement and sale of hogs were hardly restricted to the exchange from farmer to drover. The original statute declared that if any drover passing through any part of the state with a herd of animals “shall drive off, or shall knowingly and willfully suffer or permit to be driven off from the premises of any citizen of said state, or from the range in which the stock of any such citizen usually run, to any distance exceeding five miles from such premises or range, any horses, mules, neat cattle, hogs or sheep, belonging to such citizen, it shall be lawful for the owner of any such stock so driven off, to follow and reclaim the same wherever it may be found” and recover from the drover twice the value of the stock. However, if a drover picked up any extra animals and did “not pass any habitation within said five miles,” he could keep them until he passed by a homestead, where he could leave the displaced animals without any penalty. The 1845 amendment to the statute tried to police the movement of displaced, rustled, and escaping animals by adding to the five-mile spatial limit a boundary in time, declaring that if any drover “shall permit any [livestock] to remain with his or their drove, for a longer period than two days

¹⁰⁰ John Mahard, Jr., letter to the editor, *Western Farmer and Gardener* 2 (December 1841): 72.

and nights,” then they were legally subject to penalties.¹⁰¹ Laws such as this one revealed the need to deal with drovers and droves stealing or “accidentally” freeing and recruiting hogs (and other livestock) from other farms and owners as they passed through a country dense with loosely monitored animals.

Navigating Timescapes: Tides of Friction, and Friction of Terrain

Navigating an improvised legal landscape, drovers and hogs were also forced to confront a shifting and uneven seasonal terrain of friction and energy.¹⁰² With hundreds of thousands of hogs marching towards Cincinnati each year from a radius of between 150 and 300 miles, drovers, hogs, and farmers, came to produce a highly specialized geography of hog transportation. Like the better-known hog and cattle trails passing east over the mountains, the Cincinnati trails were reproduced each autumn over a network of roads, ferries, and feed stands known as “hog hotels.”¹⁰³

Few travellers or journalists had much to say about the spaces of the drives themselves in the Ohio Valley, but we know they took place along particular routes through which tens of thousands of hogs moved successfully over a short period each year. Perhaps the best evidence of how these trails would have looked and materially worked come from the extended memoir and local history of Edmund Cody Burnett, who described in careful detail the practices and worlds created in the process of driving hogs east from Tennessee through the French Broad gorge to

¹⁰¹ Drovers, Ill. Rev. Stat. 1845, Chap. 35 (passed Feb. 27, 1845).

¹⁰² I am here borrowing the term “friction of terrain” from James Scott, who uses the concept to draw attention to the ways people have sought out and transformed landscapes to make certain forms of movement harder (or easier), especially for the movements necessary for imposing and resisting forms of state control. See James C. Scott, *The Art of Not Being Governed: An Anarchist History of Upland Southeast Asia* (New Haven: Yale University Press, 2010).

¹⁰³ Sam B. Hilliard, “Pork in the Ante-Bellum South: The Geography of Self-Sufficiency,” *Annals of the Association of American Geographers* 59 (September 1969): 461-480;

North and South Carolina.¹⁰⁴ Drovers travelling to Cincinnati from Kentucky, Indiana, and Ohio would not have had to contend with the mountains and few narrow passes that Tennessee drovers did, and would therefore likely have been able to spread out their droves more and choose from a greater number of routes depending on traffic and seasonal conditions. However, streams, rivers, and passable roads would still have produced choke points, and there is reason to believe that at least the general outlines of the Ohio system would have resembled the French Broad River gorge hog pass from Tennessee to the Carolina markets.

Burnett wrote of how by the mid-nineteenth century, in “October, November and December there was an almost continuous string of hogs from Paint Rock to Asheville,” two of the largest hog hotels on the trail, and which marked the beginning and end of the French Broad gorge. At these stands, where hogs congregated to prepare for and recuperate from the mountain passage, Burnett’s childhood friend and hog drover had “known ten to twelve droves, containing from 300 to one or two thousand stop over night and feed at one of these stands or hotels.”¹⁰⁵ Knowing where hogs and drovers wanted or needed to move, and buying and building up the land, corn fields, pens, and human accommodations that made up a hog hotel could bring a farmer a considerable and predictable stream of additional revenue. Burnett himself grew up on land purchased for that very reason, his grandfather having “acquired a considerable amount of land about the mouth of Big Creek some fifty-odd miles down the river from Asheville” in 1834 for the purpose of setting up a hog stand. “Having lived most of his adult life hard by the town of Asheville,” Burnett wrote of his grandfather, “he no doubt had an intimate knowledge of the great droves of hogs that passed through Asheville every autumn on their way to the Carolina markets and hence had his attention called to the particular spot where these thousands of hogs

¹⁰⁴ Burnett, “Hog Raising and Hog Driving in the Region of the French Broad River,” 86-103.

¹⁰⁵ Burnett, “Hog Raising and Hog Driving in the Region of the French Broad River,” 88.

were gathered to begin their toilsome journey through the French Broad gorge.”¹⁰⁶ By controlling the means by which hogs powered their bodies over the terrain, hog stand owners secured their own position and power in a corn-fueled geography transitioning hogs from life to death, from living local property to mass-produced and globally marketed pork.

Because hogs could only travel around six to ten miles in a day, these hog stands had to be carefully, and densely, staggered over drovers’ routes. And the “business of maintaining such establishments, or stands as they were called,” according to Edmund Burnett Cody—who based much of his account of droving on local archives and the testimony of his friend and long-time hog drover, Jesse Stokely—“was not only profitable but also attractive to persons with a zest for entertaining travelers. Accordingly there was never a dearth of places along the main hog-driving route where man and hog could find food and rest. Indeed at one time there were as many as fifteen or more stands along the 55 miles between Big Creek and Asheville.”¹⁰⁷ Hog stands were often also agricultural craft and trade centers, where farmers, travellers, craftsmen, and merchants would congregate and exchange company, work, and money. One of the more famous hog stands along the French Broad River, for instance, contained “ ‘a hotel, store, tanyard, shoe-shop, harness-shop, farm, blacksmith-shop, waggon-factory, grist mill, saw mill, ferry, and bridge.’ ”¹⁰⁸ Indeed, hog stands were enormous establishments, capable of housing and feeding thousands of hogs and dozens of men at a time, with drove managers usually hiring fairly large teams, one man to oversee every one hundred hogs on the trail.¹⁰⁹ Burnett’s friend “Stokely relates that once when he and his father, with their hogs, stopped at Alexander’s there were as

¹⁰⁶ Burnett, “Hog Raising and Hog Driving in the Region of the French Broad River,” 89.

¹⁰⁷ Burnett, “Hog Raising and Hog Driving in the Region of the French Broad River,” 99.

¹⁰⁸ Quoted in Burnett, “Hog Raising and Hog Driving in the Region of the French Broad River,” 100.

¹⁰⁹ Burnett, “Hog Raising and Hog Driving in the Region of the French Broad River,” 100.

many as 10 separate droves there for that night. ‘This,’ he remarks, ‘was about 4,000 hogs, with one man to a hundred hogs—40 men, with a manager for each drove of hogs—making a total of 50 men to find beds for.’ Moreover, he adds, ‘It took a lot of food to feed 50 hungry men.’ ... The hotel, says Stokely, contained about 30 rooms.”¹¹⁰

While it took a steady and sizeable amount of food (and money) to feed all the men passing through the hog hotels, it took vastly more corn to feed the thousands of hogs passing over the trail during the autumn droving months. “Stokely says that 8 bushels of corn per hundred hogs, fed once a day, was the standard feed,” wrote Burnett, “and he cites a record of his father of a drive to Anderson made in 17 days during which 136 bushels of corn were fed to each hundred hogs in the drove. Eight bushels of corn would normally be about 800 ears, or 8 ears to the hog.”¹¹¹ As for the actual practices of feeding, the hogs typically stretched that food out over the course of the night. “I would say that few of the hogs would eat all of their feed at once but would pause after the fifth or sixth ear for a rest,” Burnett contended, for at the end of “a hard day’s journey Mr. Hog would be tired and sleepy anyway. An enterprising hog might crawl out from the pile sometime in the night, nose around over the lot, and get another good fill

¹¹⁰ Burnett, “Hog Raising and Hog Driving in the Region of the French Broad River,” 100. “Characterizing the stands in general, Stokely says that, besides lodging and food for the drovers, they provided pens and corn for the hogs. With regard to the provisions for lodging the drovers he remarks reflectively: ‘Sometimes the sleeping quarters would be considerably crowded.’ No doubt the standkeepers were less concerned about crowding the drivers than they were the drovers; and it is just as likely that the drivers themselves were less averse to being crowded than were the drovers. At all events it would seem that the drivers were usually crowded, for a single drove seldom had a stand all to itself, and two average sized droves meant ten drivers, besides two or more drovers or managers. The method of bedding the drivers was, however, simplicity itself. ‘The standkeeper would make down about five beds on the floor in each room, with about three men to the bed.’ There were times, however, when the drivers would not be put into beds but on pallets or blankets around a fire. This method has been described thus: ‘The drivers of these hogs were furnished large rooms, with immense log-heap fireplaces and a blanket or two each, that they furnished themselves. They would form a semi-circle upon the bare floor, their feet to the fire, and thus pass the night.’ ... There were, of course, days of cold drizzling rain when a driver would be soaked to the skin, his feet sloshing in his shoes. At the end of such a day nothing could be more welcome than a rousing fire—unless it was a steaming supper. And steaming suppers were never lacking. ‘The menu for the meal,’ says Jesse Stokely, ‘would be plenty of milk, coffee, bread—both corn and wheat, cabbage, kraut, fresh meat—beef and pork, and potatoes.’ And the price per meal, or ‘per diet’ to use the language of the stands, was 20 cents!” (102).

¹¹¹ Burnett, “Hog Raising and Hog Driving in the Region of the French Broad River,” 102.

of corn. In any case, before daybreak they would all be busy cleaning up the parts of ears and the scattered grains left over from the feast of the previous night. The hog didn't know it, though the drover did, that it was better for him not to start out on his day's journey with a full belly of undigested corn."¹¹²

Considering that around 150,000 hogs passed annually through Asheville, and as "it required a week or more to go through the county," the amount of corn necessary to feed so many hogs, 12,000 bushels per day, "must be multiplied by seven, and the result is 84,000 bushels for Buncombe County alone. This is probably less than one-third the amount consumed on the whole drive."¹¹³ With one acre producing around 40 bushels of corn, this meant that for the drive alone, farmers had to raise 6,300 acres of corn, or 25.2 million ears of corn just to power the 150,000 hogs on a drive. Multiplied out for the 300,000 to 450,000 hogs typically arriving in Cincinnati, Ohio Valley farmers would have had to raise around 15,000 acres of corn or up to 75 million ears simply to move the hogs from lifescapes to deathscapes. This was a lot of corn, and a lot of money. Not only were drovers a captive and desperate market for corn, but the hog stand owners could capture some of the surplus value of the hogs' lifework by charging drovers much higher prices. As Burnett noted, standkeepers were also usually "storekeepers who for the most part obtained their supplies of corn by providing the farmers with goods. The price paid the farmer for corn was almost invariably 50 cents a bushel; the price charged the drovers was 75 cents."¹¹⁴

Nor was corn the only commodity that could be used to absorb the surplus value of hog labor. The relations of price, work, value, and exploitation between hogs and slaves, pork and

¹¹² Burnett, "Hog Raising and Hog Driving in the Region of the French Broad River," 102.

¹¹³ Burnett, "Hog Raising and Hog Driving in the Region of the French Broad River," 102.

¹¹⁴ Burnett, "Hog Raising and Hog Driving in the Region of the French Broad River," 103.

cotton were apparently tightly linked in the Old South. In southern markets, each pound of living pork would sell for half the price of a pound of cotton.¹¹⁵ The surplus value produced by hogs as they walked and kept themselves alive to market, surplus value captured by stand owners and drovers alike, was itself a process of surplus value bound up in the material social relations of slavery, pegged to (and constitutive of) the value of slave-labor to transform pork into cotton. Thus, as planters, farmers, and manufacturers forcibly drew the social relations of work and domination tying together corn-fed hogs and cotton-picking, pork- (and corn-) fed slaves, they created a political ecological foundation of corn, cotton, hogs, free labor, and slavery upon which the transformation of hogs into light (and even more surplus value) inextricably rested.

The established trails were also a product of a spatial politics of chasing and contesting the means of life in an uneven, but energy-rich terrain. In Kentucky, for instance, hog drovers cut trails that carefully circumvented private property in order to find fodder for their hogs. But as drovers and hogs wound their way through and around ecological and economic frictions on their way to market, this alternative (to the hog-stand) geography came under siege from local residents. “In Madison and other counties, mast and acorns are very scarce. It abounds, however, in the county of Estill,” explained one article. Chasing this “free” means of life, herdsmen from Madison drove many of their hogs through Estill county, “which the Estill people considered and infringement on their rights.” Local citizen councils were convened to discuss this outrage, many plans proposed and debated, “but finally, after a good deal of debate, one was adopted. It seems

¹¹⁵ “According to Stokely, the price for hogs in South Carolina was determined by the price of cotton. If the price of cotton was 14 cents, price of hogs was 7 cents a pound. As the drover required a margin of 2 cents in order to make a reasonable profit, the price he could afford to pay for hogs in Tennessee was 5 cents. Here the time element sometimes played hob with the drover’s calculations. Between the buying and the selling a month or more usually elapsed, and in that time cotton might take a tumble, and when Jack (alias cotton) came tumbling down, Jill (alias hog) came tumbling after. ... The time normally required for selling out a drove was ten days, which might be considerably lengthened, if the drover found the market low or dull.” [Burnett, “Hog Raising and Hog Driving in the Region of the French Broad River,” 103.]

that hogs have great fears of bears. Accordingly the skin of a bear was procured, and a large sow was caught from one of the droves. She was covered with the bear skin and then let loose. She immediately returned among the droves, but on her approach all the hogs took flight, pursued by the sow with the bear skin. It is stated that since this experiment not a hog has crossed the confines of Estill County.”¹¹⁶ In the process of powering hogs along the drives to markets and weight, spatial struggles could erupt over the meaning and boundaries of forest commons, and the rights of drovers and farmers to control how and where hogs could move through the landscape. It was a politics fought out both within and outside traditional legal conventions, sometimes even relying on calculated practices of terrorism against transgressive hogs.

The specific paths from life to death, meanwhile, were also shaped by a struggle between governments and drovers to claim some of the spatial labor of the hogs. Indeed, while various public interests—from towns, to states, to the federal government—tried to capture the surplus value created and carried by the hogs on their march to slaughter, drovers tried to smuggle that value through undivided. According to the historian Robert Jones, it was “possible that in flat country the hogs were driven along secondary roads rather than the main ones; at least there is reason for believing that this was the case in Ohio, where some of the drovers avoided the National Road, presumably to avoid paying tolls.”¹¹⁷ The consolidation of hog trails around specific cornfields and feedlots was, to be sure, a process of geography and market relations. But it was also the result of insurgent marginal farmers, toll-avoiding drovers, and bearskin-clad sows.

Slight shifts in local weather patterns could also lead to a sudden reorganization of the temporal and spatial geography of driving as farmers and drovers were forced to seek out alternative routes to energy and market. Writing in 1839 during a Kentucky drought, one

¹¹⁶ Louisville Journal, “Hog Story,” *New Albany Daily Ledger* (Ind.), September 22, 1854, 3.

¹¹⁷ Jones, *History of Agriculture in Ohio to 1880*, 129.

Indianapolis newspaper reporter noted, “Large drives of hogs are daily driven through” Greensburgh, Indiana, a town located about halfway between Indianapolis and Cincinnati, “into the interior, from Kentucky. The drought in that state, has cut short, the corn crop, that but few farmers are able to fatten the hogs they have on hand, and have therefore to drive them here, and pay 25 cents per bushel, or \$10 per acre for corn; which will, in all probability, raise the price of corn, in this county.”¹¹⁸ As was the case with cotton, and therefore cotton slavery, the material and market relations of hog metabolic work could also directly affect the price of corn. And like the hog stand owners that charged drovers higher prices in order to capture a portion of the surplus value created through hog labor, Indiana corn farmers holding an advantage over corn-poor Kentucky drovers flexed and measured their power by successfully raising prices.

If hog stands and corn circuits were the major bottlenecks in the geography of energy, ferries constituted some of the most important choke points in the friction of terrain. Edmund Cody Burnett, who grew up near such a ferry, vividly described the risky but unavoidable process of moving a drove of several hundred hogs across a river. Because of the considerable difference in size between a drove and most nineteenth-century ferry boats, this process was almost always further complicated by a requisite disassembly of the drove into small groups of no more than fifty hogs and its careful reassembly on the other side of the river. During the 1840s and 1850s, the ferry boat was propelled by men with poles, and “[w]hen the river was low two men could easily manage the boat,” Burnett claimed, “although a certain skill was requisite to keep it a the proper angle.”¹¹⁹

Maintaining and projecting the same power relations between humans and hogs that farmers and drovers worked to construct in the lifescapes and on the trail was an especially

¹¹⁸ *Indiana Democrat*, October 9, 1839, 3.

¹¹⁹ Burnett, “Hog Raising and Hog Driving in the Region of the French Broad River,” 90.

pressing concern over open water. “For ferrying hogs or cattle movable railings were set up at each side of the ferryboat with gates at each end, making an enclosed pen,” and forming a mobile extension of the pig-pen complex. According to Burnett, the hogs were usually “perfectly content to remain quietly in the pen until the river was crossed, but now and then a hog, who had not been wholly subdued by his fattening-lot schooling or who was not sufficiently restrained by the load of fat he carried, would plunge over or through the railing into the river.” In order to protect against fugitive or suicidal hogs, “a canoe was kept at the side of the boat for such an emergency; if not, there would be one at one or the other of the landings, and two men would jump into the canoe and go after that hog with all possible speed. One man would grab him by an ear and hold his head above water, while the other managed the canoe. Once in a while a hog would be drowned before he could be rescued. Then a hurried butchering followed, and some of us would have backbones or spareribs for supper.”¹²⁰

The task of moving hogs from farms to hog stands to ferries to markets, which hogs and local farmers fought every step of the way, would have been difficult enough in a static terrain. The landscape through which drives were made, however, was continually shifting on seasonal tides of friction, tides sometimes moving in exactly opposite directions. The relatively flat, lightly rolling prairie lands of the Ohio Valley meant that gravity was not a serious or insurmountable force in the terrain, but the loamy, clay-rich soils meant that the effects of rain, frost, and drought were greatly amplified through the land. More importantly, the seasons when overland transportation were easiest—fall and winter—were precisely the times when freezing rivers pushed apart spaces connected by water transportation. As the historian Louis C. Hunter wrote in 1934, “Land transportation beyond the limits of the few surfaced highways was in the ante-

¹²⁰ Burnett, “Hog Raising and Hog Driving in the Region of the French Broad River,” 91.

bellum period as seasonal as water transportation but in the reverse order. The thaws of spring, and the rains of whatever season that set the wheels of river commerce in motion, bogged the highways more or less effectually in direct proportion to the abundance of moisture. Contrariwise, the droughts of summer and the frosts of winter which placed an embargo upon the rivers brought the roads to a state of greatest usefulness.”¹²¹ With the friction of country roads and rivers cycling in opposite directions through the annual timescape of the Ohio Valley, the hog farms moved closest to the urban death complexes at the same moment that frozen rivers were pushing cities farthest from one another, and from the global economy more generally.

According to Hunter, as the spaces of roads and rivers diverged in time, farmers (and drovers) usually held an advantage over shippers. “Thaws and rain did not, perhaps, so effectively hinder road transportation for the farmer as drought and frost interfered with transportation by river for shippers in the river towns and cities,” Hunter argued, and to “the extent that the farmer did his own hauling to points of shipment or sale on the rivers, a practice that was common, he could by drawing upon his reserves of energy and time overcome the handicap of bad roads more readily than could the urban shipper meet the burden of high river rates.”¹²² The fact that the tides of road friction, while less predictable, were easier to overcome than river tides created an asymmetric exploitation of energy between farmer and shipper, an asymmetry that would fall particularly hard on the hogs being driven through autumn and winter rains into river ports during the season of death.

Whereas the temporal relations of the lifescapes were primarily shaped by the race to get hogs to weight without having to winter, and the temporal limits of the deathscapes were determined by the duration of weather cold enough to slaughter, pack, and preserve, the

¹²¹ Hunter, *Studies in the Economic History of the Ohio Valley*, 24-25.

¹²² Hunter, *Studies in the Economic History of the Ohio Valley*, 26.

overland drive was where and when the temporal contradictions in uniting the spaces of life and death accumulated most severely. As the *Cincinnati Gazette* reported in January of 1823, “For several months the roads have been almost impassable. Much of the produce of the country which otherwise might have reached this market must necessarily remain on the lands of the farmer to be lost or conveyed to town at an unfavorable time. The creeks and streams are usually without bridges and being almost always high at this season much produce is lost. Markets change with a change in weather. At one time the city is flooded with an overwhelming abundance of the choicest produce of the earth and at another time it is destitute of many of the articles of domestic consumption.”¹²³ With the delivery of hogs and corn so uncertain, and the geography of life so unevenly joined with the centers of death and unmaking, cities like Cincinnati that were able to thrive amidst such relations in space and time had to be more than mere market centers or pools of available wage labor. These cities of death and industry had to be spatial and social strategies to accommodate and process peaks of influx to survive valleys of scarcity, as well as spaces capable of rotating, at the right times, their focus and openings away from river commerce towards hinterlands accumulation, and back again.

Still, despite the institutions of credit, storage, and flexible rapid mass production that gave cities like Cincinnati and Louisville a relative advantage in the region, many in Ohio Valley industrial centers envisioned a future where both the labor and nature of winter transportation could be transcended. “Independent of the uncertainty of the markets which is produced by bad roads and high waters,” the *Cincinnati Gazette* further noted, “the expense attending the intercourse carried on between city and country during the winter is a great drawback to trade

¹²³ *Cincinnati Gazette*, January 21, 1823, quoted in Hunter, *Studies in the Economic History of the Ohio Valley*, 27.

and industry. Double teams, the breakage of wagons, delays and loss of goods swell the amount of expense to a sum oftentimes greater than the value of the load.”¹²⁴

Because the temporal limits of the work of death meant that drives had to occur in winter when rivers usually remained frozen, steamships were not an option for resolving this spatial contradiction. The proliferation of railroads profoundly reorganized the possibilities for moving between country and city in both time and space. Railroads, which were far less subject to changes in the weather or seasons, created networks of narrow paths anchored in time and compressed in space. Like the canals that had transformed the spatial and temporal relations of the Ohio Valley in previous decades, railroads brought the city closer to country hogs, expanding the reach of packing centers like Cincinnati over increasingly larger hinterlands and stabilizing the movement of hogs and other goods through seasonally shifting space.¹²⁵ In the most basic sense, however, railroads simply extended the city in tendrils throughout the countryside, and while effectively bringing farmers closer to urban and commercial space, country routes did not suddenly disappear. Farmers and drovers still had to get their hogs to railroad depots over the same roads as before, and markets continued to be subjected to unpredictable swings in supply, “which is attributable alone to the bad state of the country roads, caused by the late freshets and excessive rains which fell before, during and since, the high rise in the rivers. It is difficult for the farmer to convey his produce either to the railroad or river, in consequence of this state of things, and hence the light receipts and the continued falling off in the supplies in this market.”¹²⁶

¹²⁴ *Cincinnati Gazette*, January 21, 1823, quoted in Hunter, *Studies in the Economic History of the Ohio Valley*, 27.

¹²⁵ Richard G. Arms, “From Disassembly to Assembly: Cincinnati: The Birthplace of Mass-Production,” *Bulletin of the Historical and Philosophical Society of Cincinnati* 17 (1959): 199-200; Hunter, *Studies in the Economic History of the Ohio Valley*, 30-31.

¹²⁶ *Pittsburgh Gazette*, April 28, 1852, quoted in Hunter, *Studies in the Economic History of the Ohio Valley*, 27-28.

Indeed, country roads continued to dominate the temporal topography of the antebellum Ohio Valley even after the boom in rail and steam. As Louis C. Hunter found in his survey of Ohio Valley newspapers from 1830-1860, complaints about country roads were commonplace: “The country roads are so bad ‘that little bacon finds its way into this market as yet, and prices are, therefore, comparatively high.’ The arrival of hogs are regular ‘but not in so large quantities, as if the roads were in good condition for driving.’ ... ‘country roads being so bad that teamsters are not able to take more than half loads.’ ”¹²⁷ Yet we can see here, in the continuing challenges faced by hog drivers and teamsters on seasonally shifting roads another tension contributing to the centralization of the work of death in places like Cincinnati. Difficult as it was, hogs were still clearly better able (or were easier for farmers and drovers to coerce) to navigate the friction and tides of terrain than “bacon” travelling by wagon, wheel, and horse power led by teamsters. As one historian glibly wrote, “Whether roads converging on Cincinnati were impassable, or at least difficult, for human travel made no difference to the pigs. Muddy or dry, the country roads and turnpikes provided an avenue for porkers in unending droves.”¹²⁸ Perhaps hogs really were physically better equipped to travel over muddy terrain than humans and horses. An alternative, and probably more accurate interpretation of this muddy travel, however, would be to take it as evidence of an asymmetry in power allowing farmers and drovers to more easily force hogs over terrain, no matter how difficult, than free (human) agents (and their teams of horses, mules, or oxen), who might choose a different course, or wait, refusing to move at all.

¹²⁷ Hunter, *Studies in the Economic History of the Ohio Valley*, 28.

¹²⁸ Arms, “From Disassembly to Assembly,” 199.

The Final Approach

As Frederick Law Olmsted departed south from Cincinnati, he and his fellow travellers had to wade against the tide of tens of thousands of hogs converging on the city from Ohio, Kentucky, and Indiana. “Our progress was much impeded by droves of hogs,” he wrote of the herds “grunting their obstinate way towards Cincinnati and a market. Many of the droves were very extensive, filling the road from side to side for a long distance. Through this brute mass, our horses were obliged to wade slowly, assisted by lash and yells. Though the country was well wooded, and we passed through now and then a piece of forest, I venture to say we met as many hogs as trees in all the earlier part of the day.”¹²⁹ A diffuse geography of life was compressing itself in the time and space of the winter city, where an extensive assemblage of ferries, depots, pens, and markets waited to absorb the droves and transition them into the spaces of death.

The first hogs to arrive in the winter were usually from Kentucky, from where most continued to be driven the whole way on foot at least up to the Civil War.¹³⁰ “Railroads have monopolized this business now, so far as Ohio and Indiana are concerned,” claimed one author in 1856, “but from Kentucky, hogs are yet brought to this market in the good old way.”¹³¹ Yet whether driven on foot or by rail, all hogs coming from south of the Ohio had to cross the river in order to reach Cincinnati. “Well, we druv the hogs on an’ on, till we cum right down to the river, an’ thar was the town of Sinsinnaty, not more’n twenty rods from us,” described one account of a Kentucky drover. And though his team had forced hogs over the land “the good old way,” they would cross the river in high modern fashion, as “soon a steamboat, big agin as our

¹²⁹ Olmsted, *A Journey Through Texas*, 11-12.

¹³⁰ “From the Cincinnati Gazette. A Cincinnati Slaughter House,” *Easton Gazette*, April 22, 1843;

¹³¹ “The Hog Drover’s Visit: Or, Bill Jenkins’ First Impressions of the Queen City,” 136.

barn, cum along puffin' and blowin' worse than a skeery bull. We all turned too an' druv the hogs on to her, an' then we got on ourselves."¹³²

From elsewhere, hogs arrived by bridge, and the ruling interests of major and minor deathscapes pressed hard to improve and maintain such spaces of entry. At Terre Haute, Indiana, where boosters and packers were making a play to capture more of the deathwork monopolized by Cincinnati, a local paper proudly announced that the "road over the bottom, west side of the Bridge, has recently been greatly improved. Bridges have been erected—and the road graded and raised so as to give travelling and droving across the bottom during any time of a moderate flood in the river.—Thus affording, we understand, crossing with water six feet higher than has been heretofore considered safe to travellers." By improving infrastructure, some in Terre Haute hoped to expand death operations, transforming the terrain of friction to help guide more of the hog life passing through the prairies into Terra Haute death facilities. "Not only now may the general traveller find it safer crossing at Terre Haute," the article concluded, "but dealers in hogs from the West, may also learn that their droves can pass the bottom to this place with much less danger from water than heretofore."¹³³

Railroad bridges were equally important, and equally political, spaces of hog passage. While railroads extended the reach and power of the death complexes over the landscape, rail bridges remained vulnerable interstices in the system where the "natural" friction of terrain could suddenly (and violently) reassert itself. "A terrible accident occurred on the Indiana Central Railroad at about eleven o'clock this morning, at a bridge east of Cambridge City, Ind.," reported the *New Albany Daily Ledger* in November of 1859. According to the article, the "bridge agent, a Mr. Drury, had taken up a rail in the bridge to make some repairs, and before it was replaced a

¹³² "The Hog Drover's Visit: Or, Bill Jenkins' First Impressions of the Queen City," 137.

¹³³ "Slaughter Houses," *Wabash Courier* (Terre Haute, Ind.), November 11, 1848, 2.

freight train of eighteen cars, loaded with hogs, and running at a high rate of speed came along, and before it could be properly signaled the locomotive and thirteen cars plunged headlong into the river through the bridge.” The conductor, a brakeman, a drover, and several others were killed in the river wreckage, and it “is said that over 500 hogs are killed. The locomotive, cars, and bridge are all piled up in one terrible wreck in the river.”¹³⁴ What made this such a disaster, was that the hogs had been killed in the wrong place and the wrong time, dying just outside the deathscapes where their lifework could have been transformed into exchange value for their human masters.

Still, such accidents were the exception, and railroads financed by and dominated by Cincinnati interests rapidly came to dominate the final leg of transportation for hogs moving through Indiana and Ohio during the 1840s and 1850s. The Ohio and Indiana railroads constituted a geographic triumph that helped Cincinnati to capture a plurality of the more than one million hogs killed and disassembled by packers every year in the Ohio Valley over the 1840s. It was a spatial strategy so successful that whether or not the actual total of hogs living in the region increased over the 1850s, the number of hogs killed in packing centers doubled to an average of nearly two-and-a-half million. With the aid of railroads, urban death complexes were capturing exponentially more hog life, making fortunes for railroad owners.¹³⁵ The *Gallipolis Journal* described in December of 1853 what this rail-bound mass of life looked like and meant: “A train of twenty-eight cars, containing eighteen hundred fat porkers, weighing over 200 tons, went up to Cincinnati on Sunday last, on the I. & C. R., drawn by one of the six driver

¹³⁴ “Terrible Accident,” *New Albany Daily Ledger*, November 19, 1859, 1.

¹³⁵ Margaret Walsh, “Pork Packing as a Leading Edge of Western Industry, 1835-1875,” *Agricultural History* 51:4 (Oct. 1977): 702-717. See also, Margaret Walsh, “The Spatial Evolution of the Mid-Western Pork Industry, 1835-75,” *Journal of Historical Geography* 4:1 (1978): 1-22; Margaret Walsh, “From Pork Merchant to Meat Packer: The Midwestern Meat Industry in the Mid Nineteenth Century,” *Agricultural History* 56:1 (Jan. 1982): 127-137.

locomotives. ... Besides this, another train containing over half as many hogs also went up to Cincinnati the same day. The hog trade has been worth over one thousand dollars a day to this road for about two weeks.”¹³⁶

With thousands of hogs delivered to Cincinnati every day by rail, the depots became spaces of frenetic activity. “The arrival at one of the principal depôts of one of these hog-trains, as they are appropriately called,” described *Harper’s Weekly*, “is the signal for the commencement of a scene of uproar and confusion as interesting and peculiar as one would wish to see. From the crates, the pigs, as a temporary disposition, are driven into pens, arranged, with convenient gateways, along the side of the track.”¹³⁷ The same chaotic entrance was true for those hogs reaching Cincinnati by steamer, as illustrated in an account of a Kentucky drover: “ ‘In a jiffy we war on t’other side, and then we druv the hogs right squar through the town. Lawrdy! you oughter just have seen the place. There was more’n ‘nough people than it would take to lam all Mexico, and the busses and wagons couldn’t be packed on Uncle Josh’s plantation. It kept me dodgin’ all the time, an’ the only wonder is that the hogs warn’t all killed afore they got to the pens. I *was* a little skeered I tell you, and from the way the critters squeeled, I guess they war too.’ ”¹³⁸

Getting the hogs into the city and the unloading pens was only the first step. They still had to reach the slaughterhouses, most of which were located in the Deer Creek and Mill Creek Valleys at the outskirts of the city.¹³⁹ This final drove, usually through two miles of city streets from the rail depots, was “a different portion of their journey, which they are forced to

¹³⁶ “Lawrenceburg Register, 14th,” *New Albany Daily Ledger*, December 19, 1855, 2.

¹³⁷ “The Hog Trade of Cincinnati,” *Harper’s Weekly*, February 4, 1860, 73.

¹³⁸ “The Hog Drover’s Visit: Or, Bill Jenkins’ First Impressions of the Queen City,” 137-138.

¹³⁹ Cincinnati Gazette, “The Hog and its Product—The Hog Culture—Slaughtering, Packing, &c.,” *Gallipolis Journal*, January 12, 1854, 1.

accomplish on their own feet.” And even with railroads dominating the final approach to the deathscapes, drovers continued to be indispensable agents in the movement of hogs from life to death. As *Harper’s Weekly* wrote, the “direction and management of this transit is undertaken by drovers experienced in the business, who engage for the occasion the assistance of a suitable number of boys; scores of whom, of every age, color, and nation, are generally collected about the depôt when a hog-train is expected, clamorous for an engagement.” This was no smooth and politely prearranged commercial exchange of goods, but an informal, nakedly contested market where men, boys, and hogs all struggled in different directions. “Whoever succeeds in securing the job by contract with the owner of the hogs is instantly beset by dozens of these boys, vociferously eager to be employed in the enterprise,” explained *Harper’s*, and the “shouting and screaming of the boys, gabbling in several languages at once, the quarreling and tussling of the unruly among them, the angry and peremptory exclamations of the men, combined with the squealing of the hungry pigs, produces an exciting scene of tumult and contention which is only quieted by the final departure of the pigs to that bourne where the wicked cease from troubling and the weary shall be finally at rest.”¹⁴⁰

The urban droves from depot pens to slaughterhouse pens were enormous, ranging from two-hundred to one-thousand hogs forced by a drove manager and a team of hired boys with whips and shouts straight through the city streets. “A drove once started on its journey is bound, at all hazards and against all obstacles, to go through,” regardless of any obstruction, human, vehicle, or otherwise. Such obstacles were “a consideration that troubles in no degree the heads of the contractor and his yelling and slashing gang of vagabonds. You may be splashed and run into, delayed and otherwise offended, upset, it may be.” For the duration of these final droves,

¹⁴⁰ “The Hog Trade of Cincinnati,” *Harper’s Weekly*, February 4, 1860, 73-74.

the city belonged to the drovers and the hogs, and to “that sturdy and determined man, then, with his boot-tops over his pantaloons, a coon-skin cap on his head, red flannel sleeves on his arms, and a cracking whip in his hand, it is all one. He will heed you not at all. The main business of his life at this moment, mark you, is to ‘land those pigs on the other side of Jordan;’ and, as that little begrimed, yelping ragamuffin there, with a hoop-pole in his hand, will assure you, on the slightest intimation that you take any interest in the subject, ‘You may bet yer life, old cock, he’ll do it.’”¹⁴¹ Given the very real power and resistance of the hogs, this single-minded intensity was not something that any drover could afford to lose. For a more detailed account of the work, labor relations, and contests of droving hogs through the city that acted on their own, outside the will of drovers and owners, it is worth quoting in full an account by Bill Jenkins, a young drover from Kentucky on his first visit to Cincinnati, of how a group of runaway hogs led to confusion over the boundaries and identities of droves and property:

“Directly I seed two hogs goin’ off from the drove, an’ as a matter of course I goes arter ‘em. I chased ‘em clear up a lane, an’ heads an’ turns ‘em back agin. I was a drivin’ ‘em along to the drove, when a feller sez, ‘Hey, you, what you going to do with them ‘ar hogs?’ ‘Take ‘em to the drove,’ sez I. ‘Drove,’ sez he, ‘them’s my hogs.’ ‘Your’n,’ sez I, remembering Uncle Josh’s talk about skinnin’. ‘I ain’t so green as you might make out.’ ‘Well, you leave them hogs alone,’ sez he, ‘or I’ll bounce you.’ That ar sort of made me riley, so sez I to him, ‘bounce and be darned.’ This appeared to tickle a hull lot of fellers who was standin’ round thar, and one on ‘em sez, ‘Go it, Kaintuck.’ I give the two hogs a whack, which sent ‘em squeelin’ on to’ards the drove. I run arter ‘em, and was just laffin’ to myself to think how I’d stood up to the city feller, when cha-bang! sumthin’ took me side the head. It sorter laid me out, an’ the first thing I know’d that darn’d chap was a drivin’ off the hogs agin.—‘Hello,’ sez I, singin’ out to the top of my voice, ‘Hello, fotch back them ar hogs.’ ‘Go to grass,’ sez he. This sorty of raised my dander agin, an I started arter him. I hadn’t gone more’n ten steps, afore two fellers laid hands on me.—‘Stan’ back,’ sez I, determined to whale every thing of my thinchies. ‘Hold on,’ sez one on ‘em, pintin’ to a piece of tin on his coat, ‘hold on,’ sez he, don’t you see, we’re watchmen?’ That sort a cooled me down, and sez I to ‘em, ‘don’t you see that feller drivin’ off them hogs?’ ‘Sartin,’ sez he to me, ‘and they’re his hogs.’ ‘I can whip,’ sez I, ‘any man what sez that.’ At that a hull crowd had gathered round, and some said, ‘go it, Greeny,’ and some said, ‘go it, Kaintuck.’ I told ‘em just to draw back and form a ring, and’ I could whale ‘em all, one at a time. Just then, the boss of the drove cum up, an’ sez he, ‘Bill, them aren’t my hogs!’ ‘Nough said,’ sez I, as I walked off to the drove, might glad the boss had cum up, for I know’d I’d had hard work to have fit all them chaps.”¹⁴²

¹⁴¹ “The Hog Trade of Cincinnati,” *Harper’s Weekly*, February 4, 1860, 74.

¹⁴² “The Hog Drover’s Visit: Or, Bill Jenkins’ First Impressions of the Queen City,” 138-139.

Considering the confusion, violence, and police attention that could erupt over a fugitive hog, Bill Jenkins “was monsus careful all the way” to the pens “not to run after any more hogs, because, thinks I to myself, the boss may do it.”¹⁴³ For a hired hand like Jenkins, the risk of chasing after a hog and potentially getting wrapped up in challenges over property relations was simply not worth it. It was a small but real chance for escape that many hogs seemed to have pursued, even if they did not understand the social relations they were exploiting, and some with more enduring success than others. According to the scholar Richard G. Arms, on the journey to the slaughterhouses, “[s]ome hogs invariably became separated from the droves and made free use of the city’s streets, alleys, and even the sidewalks where they competed, unattended and uninhibited, with citizens for their use. Many pigs roamed unrestricted into, around, and under the homes of tolerant Cincinnatians.”¹⁴⁴ Less tolerant visitors to the city, however, had a different view of both the fugitive and captive hogs that gave Cincinnati the name of “Porkopolis.” Mrs. Houstoun, a British visitor to the antebellum city, complained that Cincinnati was, “literally speaking, a *city of pigs* ... a monster piggery ... Alive and dead, whole and divided into portions, their outsides and their insides, their grunts and their squeals, meet you at every moment.” She could not even escape the hogs during a carriage ride to the suburbs, where she and her friends encountered droves of “the unclean beasts, grunting along under the very wheels of our carriage”

¹⁴³ “The Hog Drover’s Visit: Or, Bill Jenkins’ First Impressions of the Queen City,” 139.

¹⁴⁴ Arms, “From Disassembly to Assembly,” 198. Hogs, it should be noted, were not the only actors to seek escape through the interstices of the deathscapes. At least some slaves used the movement of hogs from life to death to secure their freedom. In 1856, a group of slaves from Boone County, Kentucky (around 15-20 miles from Cincinnati) were on trial as fugitives in Cincinnati. They had been led by an enslaved man named Simon who had, for several years prior, helped drive hogs into the city (and across the important political boundary of the Ohio River) with his master. Over the course of his drives, Simon had made contacts with members of the free black community living in Cincinnati, some of whom he was connected to by family. In the winter of 1856, using slave passes previously issued them, and the death march of the hogs as a pretense for entering the city, Simon and six other Kentucky slaves escaped. Their trial became a flash point for the politics over the fugitive slave law and the complicated geography of freedom and slavery in Cincinnati, a city right on the border of the Ohio River and a space through which slaves, fugitives, free blacks, and the products of both slavery and wage labor passed through regularly. See Cincinnati Gazette, “The Cincinnati Slave Case,” *Anti-Slavery Bugle*, February 9, 1856, 3.

on their way to the slaughterhouses at the city outskirts. “Those horrible Cincinnati pigs!,” she proclaimed, were simply everywhere in their living and their dying, for “[w]e could not look into a warehouse in the street without being agonized by the sight of dead corpses, heaped and piled upon one another, up to the ceiling, all singed and white and cold-looking, huddled together without any regard to decency, or any consideration for the feelings of the survivors.”¹⁴⁵

Most hogs, however, remained trapped within the force fields of whips, commands, and street boundaries until they were more securely contained inside the slaughterhouse pens. Indeed, hundreds of thousands of hogs were “driven through the city (the more corpulent being assisted on their pilgrimage up from the river by drays and wagons) out to Deer Creek and Brighton, where expansive pens and houses are erected for their accommodation.”¹⁴⁶ And only then were hired drovers like Jenkins or the boys seeking work at the hog train depots finally paid.

The Deathscapes

*Our speculations are over. We have followed the porker through the short course of his existence, from his cradle in the green woods to his grave in the pork barrel. He entered the city an unwilling traveller perhaps, but still openly, borne by his own limbs. He leaves it mysteriously, in various ways, in pork barrels, in lard kegs, in souse casks. He is dragged to the river, floated off upon its surface, and henceforth becomes an article of consumption in the commercial statistics of the country. His blood mingles ... with the waters of the Ohio. No vestige remains behind of the multitudes which recently swarmed in the streets, save only that piles of their toenails may be seen in front of divers establishments.*¹⁴⁷

By the eve of the Civil War, the “human chopping machines” of Cincinnati were slaughtering nearly half a million hogs each winter. For a mere four-month window, the city transformed in time and space to become a massive, industrialized deathscape, where the lives of about 450,000 hogs were violently disassembled by around ten thousand wage workers into pork,

¹⁴⁵ Quoted in Arms, “From Disassembly to Assembly,” 199.

¹⁴⁶ Cincinnati Gazette, “A Cincinnati Slaughter House,” *Easton Gazette* (Md.), April 22, 1843.

¹⁴⁷ New York Spirit of the Times, “Desultory Thoughts on Swine. Written at Cincinnati,” *Western Farmer and Gardener* 2 (February 1841): 106-107.

soap, lard lights, and enormous quantities of surplus value.¹⁴⁸ Put differently, every year the geographies of life and death came together in Cincinnati to squeeze millions of months of hog-work through the wage relations of thousands of months of human labor. The politics surrounding the wage relation between industrial capital and labor were, therefore, only partly about the rate of exploitation of human workers; they were also a scramble among both capitalists and (mostly male, mostly free) human workers to claim and distribute (through the institutions of wages and property) the accumulated, embodied work of the hogs as it became surplus value during the labor processes of death and disassembly.

A winter visitor to the city “sees and hears all around him the indications of this extensive branch of its industrial enterprise, and can readily believe that to the pig and his manifold products the city is largely indebted for its extraordinary growth and the rapidly accumulated wealth of its inhabitants.” As *Harper’s Weekly* contended, winter revealed the secret of Cincinnati’s success as a global city and frontier of industrial production; it was a city made through and by the lives and deaths of hundreds of thousands of hogs. And so a winter visitor “understands why it is called Porkopolis. He comprehends its relation to and dependence upon the pig. The statement of the commercial reporters, that about 450,000 hogs are annually slaughtered by the city butchers, and distributed among the nations of the earth, does not surprise him; and he is prepared to admit the economical importance and staple value of the business, as a leading and profitable branch of American industry.”¹⁴⁹ According to the Cincinnati writer Charles Cist, a winter visitor could not help but be “bewildered in the attempt to keep up with the eye and the memory, the various and successive processes he has witnessed, in following the several stages of

¹⁴⁸ For statistics on the hog industry and its change over time, see especially, Cist, *Sketches and Statistics of Cincinnati in 1851*; Cincinnati Chamber of Commerce, *Annual Report* (1866), 58-62; and Walsh, “Pork Packing as a Leading Edge of Midwestern Industry, 1835-1875,” 702-717.

¹⁴⁹ “The Hog Trade of Cincinnati,” *Harper’s Weekly*, February 4, 1860, 72.

putting the hog into its final marketable shape, and in surveying the apparently interminable rows of drays, which, at that period, occupy the main avenues of the river, in continuous lines, going and returning, a mile or more in length, excluding every other use of those streets from daylight to dark.”¹⁵⁰

The work of death began in the slaughterhouses. “Arrived at the slaughter-houses, the way-worn pigs, with waled backs and bleeding feet, are deposited in pens and fed to restore their condition,” recounted *Harper’s Weekly*, adding that these slaughterhouse “pens are, in most cases, connected with the killing-sheds by inclined plank ways, up which the pigs are driven as fast as they may be wanted by the butchers.”¹⁵¹ Kept organized, disciplined, and imprisoned through a vast system of pens encircling the slaughterhouses, the hogs entered the terminal reaches of a geography of captive life everywhere walled in by whips and fences. Here was the end of the pig-pen complex, where the “hogs for slaughter are allotted, as they are owned, to different pens regularly numbered, all of which communicate to one leading in to the upper end of the slaughter house.”¹⁵² More poetically, a reporter for the *New York Spirit of the Times* stopped before the Deer Creek slaughterhouses to “contemplate the preparations that have been made here for wholesale destruction. See the hollows of the surrounding hills filled with enormous ranges of nicely white-washed buildings. They are slaughter-houses, now reeking in the frosty morning air like a witch’s cauldron. Look at the pens around them, far and near, overflowing with their population;—‘Thick as Autumnal leaves in Vallambrose,’ the contributions of three States.

¹⁵⁰ Cist, *Sketches and Statistics of Cincinnati in 1851*, 286.

¹⁵¹ “The Hog Trade of Cincinnati,” *Harper’s Weekly*, February 4, 1860, 74.

¹⁵² Cincinnati Gazette, “The Hog and its Products.”

Inspect the ranges of huge warehouses that line the canal, piled ‘heaps upon heaps’ with barrels and other of the paraphernalia of the ‘dreadful trade.’”¹⁵³

In 1851, the ten slaughterhouses of Cincinnati, which were located in the outskirts of the city, employed between them as many as one thousand men, “selected for this business, which requires a degree of strength and activity, that always commands high wages.”¹⁵⁴ The slaughterhouses, situated in time and space at the critical juncture between the worlds of hog life and hog death, were flexible temporal technologies designed to move structures rooted in space through unpredictable changes in time: “fifty by one hundred and thirty feet each in extent, the frames being boarded up with movable lattice-work at the sides, which is kept open to admit air, in the ordinary temperature, but is shut up during the intense cold, which, occasionally, attends the packing season, so that hogs shall not be frozen so stiff that they cannot be cut up to advantage.”¹⁵⁵ Writing in 1851 of the enormous integrated slaughter, packing, and lard-rendering house of Milward & Oldershaw, situated on the opposite side of the river from Cincinnati in the city of Covington, Charles Cist informed his readers that the “slaughter-house, which will contain four thousand hogs, is on the upper floor, and the hog-pens are on the roof, the hogs being driven up an inclined plane.” The slaughterhouse, which measured “three hundred and sixty feet front, and runs back one hundred and sixty feet,” was, according to Cist, “doubtless the largest building for the purpose in the United States,” and which the previous season had housed and channeled the death work of 11,746 hogs.¹⁵⁶

¹⁵³ New York Spirit of the Times, “Desultory Thoughts on Swine. Written at Cincinnati.”

¹⁵⁴ Cist, *Sketches and Statistics of Cincinnati in 1851*, 280.

¹⁵⁵ Cist, *Sketches and Statistics of Cincinnati in 1851*, 280.

¹⁵⁶ Cist, *Sketches and Statistics of Cincinnati in 1851*, 228-229.

Driven by men with whips and by the momentum of the animals behind them, the hogs were forced up the inclined planks into the killing pens at the beginning of the long slaughterhouse buildings. This would be their last act of living labor, made to “raise themselves to the second story of the building by the use of their own muscular power,” against the force of gravity and into a structure designed to take advantage of that gravitational gradient to pull the accumulated masses of the hogs (the embodied products of their lifework) down through the descending slope of death work.¹⁵⁷ “A pen selected for slaughter is open[ed],” the *Cincinnati Gazette* began, “the hogs driven up thereto, and some twenty admitted into one of two Knock Down Pens.”¹⁵⁸ Driven into what *Harper’s Weekly* called “the death chamber,”¹⁵⁹ twenty at a time, “where they are crowded as thick as they can stand,”¹⁶⁰ the “door of this room is then closed, and on the backs of the hogs crowded in this narrow pen, walks Tom Broadman with a double hammer, constructed for the purpose, weighing from 1½ to 2 pounds, and with one blow on the head generally fells to the floor each one of the hogs.”¹⁶¹ Once knocked unconscious or dead, two other men immediately seized the hogs, hauled them “out a few feet on to a platform where their throats are cut, the blood escaping through a lattice floor, and sometimes saved for use, and the doors opened to admit other twenties in succession during the working hours of the day, or until the supply of hogs are terminated.”¹⁶²

What happened next was a rapid flurry of death work, a division of labor only partly powered by steam and coal, but an unmistakable mechanization of human labor through which

¹⁵⁷ “Pork-Packing,” *Harper’s Weekly*, September 6, 1873, 778.

¹⁵⁸ *Cincinnati Gazette*, “The Hog and its Products.”

¹⁵⁹ “The Hog Trade of Cincinnati,” *Harper’s Weekly*, February 4, 1860, 72.

¹⁶⁰ Cist, *Sketches and Statistics of Cincinnati in 1851*, 279.

¹⁶¹ *Cincinnati Gazette*, “The Hog and its Products.”

¹⁶² *Cincinnati Gazette*, “The Hog and its Products.”

hogs were mass-produced into pork. From the moment the hammer man knocked a hog unconscious, the animal was “immediately seized by the butchers inside, and stabbed, bled, scalded, scraped, and cleaned out before he has a very distinct or satisfactory impression of what has happened to him. He is converted into pork in about three minutes from the time his tail glides unsuspectingly beneath the insidious trap that slips down at last between him and the trials and comforts of the outer world forever.”¹⁶³

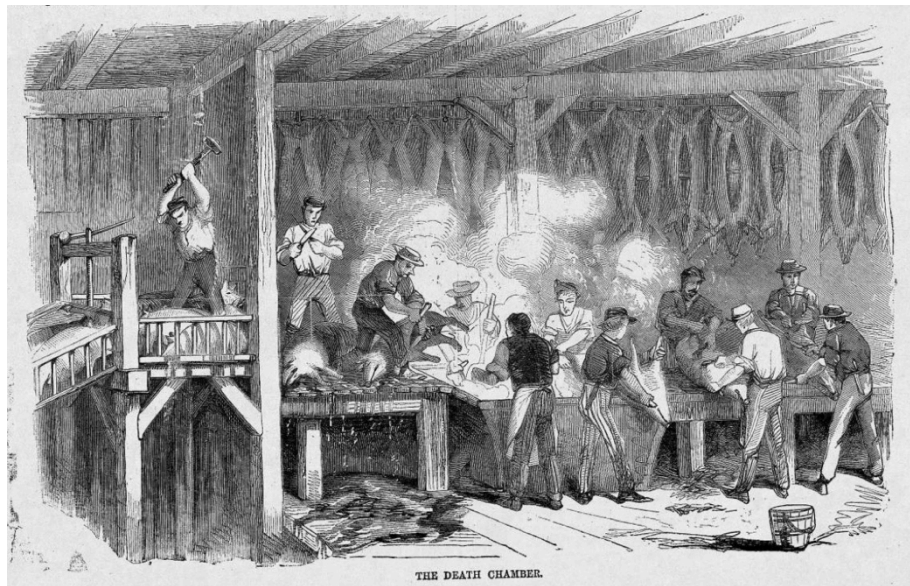


Figure 4.1. “The Death Chamber,” in *Harper’s Weekly*, February 4, 1860, 72.

From the “death chamber,” men rolled the bled hogs off the bleeding platform into tubs or troughs of scalding hot water, heated by steam. The *Cincinnati Gazette* described the scalding tub of a Deer Creek valley slaughterhouse as “a wooden tub, 16 feet long, 4½ feet wide and 4 feet deep, filled with cold water and heated by steam, and kept heated uniformly by a furnace and boiler adjacent.” The steam, which was conveyed from the boiler by a pipe, moreover, was almost deafeningly loud, but still not loud enough to overpower the terrified screams of the hogs, for “the steam escapes with a roar not quite loud enough to drown the squeal of an unskillfully

¹⁶³ “The Hog Trade of Cincinnati,” *Harper’s Weekly*, February 4, 1860, 74.

felled porker by the murderous blow of Broadman's 'double knocker.' ”¹⁶⁴ Amidst the shrieks of the animals and the roar of the steam, men rolled a continuous stream of dead hogs into the boiling-hot tubs, which could hold around six at a time. At the other, lower end of the tub, two men watched to make sure the hogs rolling toward them had been in the scalding bath sufficiently long before they would “press a lever, and thereby remove two hogs that are fit for the bench, by an apparatus called a rack, the top of which is a series of rollers that is constantly throwing out the scalded animal upon a long platform, even, smooth, and gradually inclined to the lower end.”¹⁶⁵

Powered by steam, gears, human muscles, and the consumption of the final-counter gravitational labor of the hogs, the hogs moved onto and down the inclined bench. There, upon the benches, “one of the busiest scenes may be witnessed of the manœuvres, of the twelve or fifteen men stationed up and down each side of the bench, on six scalded hogs undergoing the process of being scraped, shaved and ham-strung.”¹⁶⁶ While three pairs of men facing each other across the bench sequentially de-bristled, scraped the hair off of, and hamstrung up each pair of hogs with a wooden bar called a gambrel “while the hog is reeking with steam,” additional men slid and rolled the carcasses down the incline of the bench from station to station, and others were employed sharpening knives, or pouring water over the scalded hogs to keep their flesh wet (and presumably to cool it down enough that the workmen would not too badly burn their hands).¹⁶⁷ It was at once a division of labor and a unifying labor process through which men divided by race and ethnicity were made to work together, were made into labor. Indeed, around

¹⁶⁴ Cincinnati Gazette, “The Hog and its Products.”

¹⁶⁵ Cincinnati Gazette, “The Hog and its Products.”

¹⁶⁶ Cincinnati Gazette, “The Hog and its Products.”

¹⁶⁷ Cist, *Sketches and Statistics of Cincinnati in 1851*, 280; Cincinnati Gazette, “The Hog and its Products.”

the benches, “in the uproar of a Babel of confusion, worked the laughing negro, mirth-loving Irishman, and the sedate, hard working German, side by side; and speeding about from place to place—urging them on, correcting their faults and directing their labors, is ever moving the vigilant Overseer, Martin Cain, who has for 20 years been thus engaged.”¹⁶⁸

The next stage in the labor process of death was organized around a machine called “the wheel.” Using the wooden gambrel inserted between the hind legs of each hog, a team of three men—two for the front legs, and one grabbing the gambrel—hung each hog on one of eight iron hooks attached to a circular wooden framework.¹⁶⁹ As the wheel revolved, the suspended hogs were passed through several more work stations. First, they were washed with a bucket of water to clean off any remaining hair or blood. Second were the gutters, where “two experienced men, one of whom cuts open the hog and the other cuts and cleans out the offal with wonderful rapidity and skill.”¹⁷⁰ Finally, the hogs were washed again and cleaned out thoroughly, then swung “to a point where three or four stalwart men, called wet hog carriers, mostly clothed in oil cloth pants and jackets, successively take hold of the hog, swing it until the right momentum is obtained, when it is dexterously thrown across their own shoulder, they stooping to receive it, with one hand loosing the gambrel from one leg, which causes it to fall on the floor, and the animal is thus borne off to an adjacent apartment, known as the Drying Room.”¹⁷¹ The speed and scale of this death work was extraordinary. In 1843, the *Cincinnati Gazette* reported on the Mill Creek slaughterhouse of a Mr. Clearwater, noting that it was a typical establishment and gave “employment to 40 hands, who have killed nearly 30,000 hogs ... Their greatest

¹⁶⁸ Cincinnati Gazette, “The Hog and its Products.”

¹⁶⁹ Cist, *Sketches and Statistics of Cincinnati in 1851*, 280.

¹⁷⁰ Cincinnati Gazette, “The Hog and its Products.”

¹⁷¹ Cincinnati Gazette, “The Hog and its Products.”

achievement was killing 827 hogs in one day out of a little over 8 hours at another time they killed in three days 2385—and at another in four days 2809. Thus the thing has been repeatedly done of killing and completely dressing more than one hog in a minute through the day.”¹⁷²

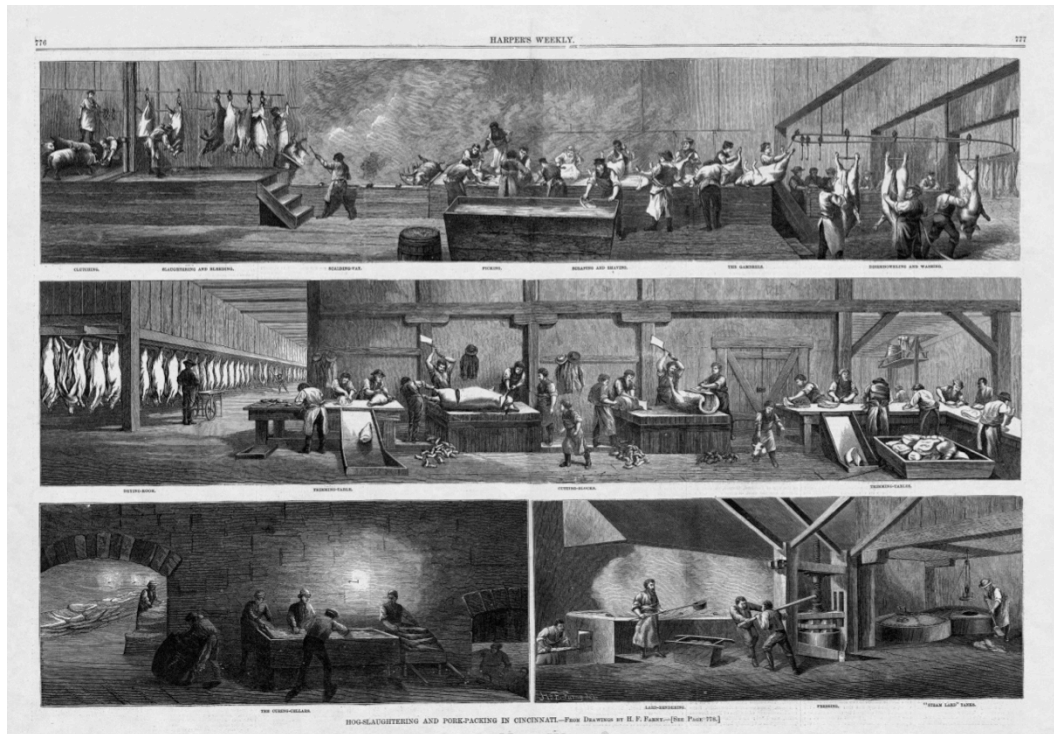


Figure 4.2. “Hog-Slaughtering and Pork-Packing in Cincinnati,” drawings by H. F. Farny, in *Harper’s Weekly*, September 6, 1873, 266-267.

From this point on, the organic material involved in the production of the means of hog lights diverged temporarily before recombining in lard rendering establishments. The gutters who ripped open the hogs were also collecting huge amounts of offal and gut fat. In most times and places, this gut fat would simply be waste, but in Cincinnati, where slaughterers produced literally millions of pounds of it, gut fat was gold. At the start of the 1840s, when Cincinnati was beginning its ascent as the pork capital of the world, “slaughters formerly got the gut fat for the whole of the labor thus described, wagoning the hogs more than a mile to the pork houses, free of expense to the owners. Every year, however, enhances the value of the perquisites,” especially the

¹⁷² Cincinnati Gazette, "A Cincinnati Slaughter House," *Easton Gazette* (Md.), April 22, 1843.

organs and fat that could be sold to soap, lard oil, and candle manufacturers, and by 1850, “from ten to twenty-five cents per hog have been paid as a bonus for the privilege of killing.”¹⁷³ By 1854, slaughterhouses were each employing half a dozen men in cleaning off and washing the gut fat tossed away by the gutters, and this gut fat had become worth 30 to 40 cents.¹⁷⁴ In other words, because of the by-product industries transforming pork-waste into the means of light, lubrication, and cleanliness, slaughterers actually paid hog owners for the rights to kill the hogs and claim the fat. They paid hog owners in order to gain access to portions of the lifework of hogs that could only be transformed into exchange value, into capital, through the particular economies of scale of death of places like Cincinnati.

The other path of lard followed the gutted hog carcasses. After hanging in the drying rooms, workers carted the hogs from the slaughterhouses to the pork packing houses, the “human chopping machines” that so overawed Frederick Law Olmsted as he watched men disassemble hogs into pork. After being transformed into ham, shoulders, bacon, sides, and tender loins, the “leaf lard [kidney fat] is then torn out, and every piece distributed with exactness and regularity of machinery, to its appropriate pile,” and when the price of lard was high, it “tempts the pork packer to trim very close, and indeed, to render the entire shoulder into lard.”¹⁷⁵ As *Harper’s Weekly* noted, “Every scrap, even the apparently most worthless, is saved and turned to account, either as an article of food or for use in the arts. Its flesh is converted into hams and pickled pork; its lean scraps into sausage meat, and its fat scraps into lard, stearine candles, and lard oil...”¹⁷⁶

¹⁷³ Cist, *Sketches and Statistics of Cincinnati in 1851*, 280.

¹⁷⁴ Cincinnati Gazette, “The Hog and its Products.”

¹⁷⁵ Cist, *Sketches and Statistics of Cincinnati in 1851*, 281.

¹⁷⁶ “The Hog Trade of Cincinnati,” *Harper’s Weekly*, February 4, 1860, 74.

The Means of Hog Light

The spatial and temporal division of hog life and death in the Ohio Valley concentrated enormous quantities of dead hog flesh in winter cities like Cincinnati at a time when labor was suddenly cut free from the commercial and manufacturing relations employing them during the warmer months of the year. In cities pushed out of global and regional trade networks by frozen rivers and reduced steam traffic, and in countrysides finished with labor intensive harvests, a seasonally constituted reserve army of labor made winter Cincinnati an industrialist's paradise.¹⁷⁷ With the collective power of workers to set wages and determine hiring practices undercut by the change in seasonal commerce, those who controlled the means of mass hog death could pull in vast droves of hogs and a cheap labor force composed of the idled urban and agricultural working classes. "The value of these manufacturing operations to Cincinnati," Charles Cist wrote of the hog killing and processing industries, "consists in the vast amount of labor they require and create, and the circumstance that the great mass of that labor furnishes employment to thousands, at precisely the very season when their regular avocations cannot be pursued." Around fifteen hundred coopers from city and country were hired to make lard kegs and pork barrels "at a period when they are not needed on stock barrels and other cooperage, and the country coopers, whose main occupation is farming, during a season when the farms require no labor at their hands." And it was not only in the auxiliary container industries that employers recruited workers into the political economy of hog death. The city's manufacturing class also constituted the primary labor processes of hog unmaking from the temporally routed winter working classes, and so considering "that the slaughtering, the wagoning, the pork-house labor, the rendering grease and lard oil, the stearin and soap factories... supply abundant occupation to men, who, in

¹⁷⁷ Steven J. Ross, *Workers on the Edge: Work, Leisure, and Politics in Industrializing Cincinnati, 1788-1890* (New York: Columbia University Press, 1985), 123.

the spring, are engaged in the manufacture and hailing of bricks, quarrying and hauling stone, cellar digging and walling, bricklaying, plastering, and street paving... employments, which in their very nature, cease on the approach of winter, we can readily appreciate the importance of a business, which supplies labor to the industry of, probably, ten thousand individuals, who, but for its existence, would be earning little or nothing, one-third of the year.”¹⁷⁸

The factories mass-producing candles and lard oil from the reclaimed waste of the pork industry seized full advantage of this political ecology of living human labor and dead hogs. These hog light manufacturers were the recycling centers where every shred of hog flesh, every iota of embodied hog work was transformed into value. As the *Cincinnati Gazette* reported of “the establishment of Koeble & Miller, near the Brighton House, but one of several establishments in the city, we learned to what extent even the smallest and most inconsiderable portion of the hog was used.” Situated on the banks of the Mill Creek, the “rendering apartments are built on the banks of a ravine which carries all the waste matter off to Mill Creek. On the side of the building next to the ravine is a row of twelve large wooden tanks with tops, which are raised when required, to admit the stock, of which black and white grease are made.” Into these rendering vats, men dumped gut fat, leaf lard, and other hog parts. They also purchased whole hogs such as those “that have smothered to death, or such as were scalded by the recent explosion, worth 2½c. a pound,” and threw them “into these tanks, whole, and with the big entrails are boiled and steamed, the grease at proper times being skimmed off and the bones and refuse matter let down into the ravine by touching a lever which opens a trap door.”¹⁷⁹

The grease, purified by lye, became clear and white in color, and was then subjected to a process almost identical to that which spermaceti manufacturers used to process sperm oil.

¹⁷⁸ Cist, *Sketches and Statistics of Cincinnati in 1851*, 287-288.

¹⁷⁹ Cincinnati Gazette, “The Hog and its Products.”

Placing the purified grease into linen packages “laying in a small frame 7 by 12 inches, the cloths folded over and the packages thus folded placed between boards and put, in some establishments, under steam or hydrostatic pressure, and others in presses, arranged in great numbers up and down a long apartment, regulated by cogs, levers and weights, by which a gradually increasing pressure causes the lard oil to exude, which runs down into vats in the lower story to be barrelled, the residum in the cloths, being the article of commerce which is called stearine, of which Star candles are made.”¹⁸⁰

Most refiners relied primarily on gut fat and leaf lard, but some specialized in consuming entire hog carcasses, a practice which became even more common as the value of lard began to outpace that of any part of the hogs but hams.¹⁸¹ One of these hog-fracturing factories consumed “in one season, as high as thirty-six thousand hogs. It has seven large circular tanks—six of capacity to hold each fifteen thousand pounds, and one to hold six thousand pounds—all gross.” The owners of this factory, a combined packing and lard oil manufacturer, first hired and arranged men into packing teams to cut away the hams from slaughtered, dressed hogs, but unlike other packers left the rest of the hog intact. Other men were then employed to dump “the entire carcass, with the exception of the hams,” six-hundred carcasses per day, into the enormous circular tanks, “and the mass is subjected to steam process, under a pressure of seventy pounds to the square inch; the effect of which operation is to reduce the whole to one consistence, and every bone to powder,” while the fat was then drawn off. This factory was also a recycling plant for the entire city: “[b]eside the hogs which reach this factory in entire carcasses, the great mass of heads, ribs, back-bones, feet, and other trimmings of the hogs, cut up at different pork-houses,

¹⁸⁰ Cincinnati Gazette, “The Hog and its Products.”

¹⁸¹ Cist, *Sketches and Statistics of Cincinnati in 1851*, 284.

are subjected to the same process, in order to extract every particle of grease. This concern alone turned out, the season referred to, three millions six hundred thousand pounds lard.”¹⁸²

In 1851, lard oil and stearine manufacturers were producing three million pounds of stearine and over a million gallons of lard oil, almost all destined for use as illumination.¹⁸³ Because the fracturing of hog carcasses into the means of light also produced the means of soap, a fatty acid pressed from the purified stearine, many candle manufactures were also soap makers. The most famous of these joint operations, one that would later remake monopoly capitalism, was the Cincinnati-based Procter & Gamble. Their factory was “probably engaged more extensively in manufacturing operations, than any other establishment in our city. They consume seven hundred barrels rosin, and three hundred tons soda ash; ten thousand carboys—or six hundred thousand pounds—sulphuric acid; one hundred and fifteen thousand pounds candle-wick, and thirty thousand barrels, of two hundred and fifty pounds each—or seven million five hundred pounds—lard, annually, in their various products. Their sales have largely exceeded one million dollars yearly; and in consequence of the high price of the great staple, lard, will this year, doubtless, reach much higher figures than heretofore. They employ eighty hands, in the various departments of their business.”¹⁸⁴ Using vast steam-powered screw presses, mold and wick machines, Procter & Gamble were able to transform the lard from around a hundred thousand hogs into over a million dollars worth of value, all with only eighty wage workers. The final, furious creative destruction through which hogs were passed on their way into and out of the deathscapes as light, then, was a space of near pure-profit for capital, extracted from hogs and men with the aid of steam-powered machines.

¹⁸² Cist, *Sketches and Statistics of Cincinnati in 1851*, 283-284.

¹⁸³ Cist, *Sketches and Statistics of Cincinnati in 1851*, 284-285.

¹⁸⁴ Charles Cist, *Sketches and Statistics of Cincinnati in 1859* (1859), 266.

Evidence of working conditions in the candle factories of Cincinnati is difficult to find, but if it was anything like in New York, this increased scale of hog destruction would also have likely witnessed an increased temporal exploitation of factory workers. In 1853, the Operative Tallow Chandlers of the city of New York held a series of meetings to protest both the low wages (\$1.25 a day) and the round-the-clock twelve-hour shifts. “The hours of work are from 7 A.M. to 7 P.M., one hour being allowed off, and from 7 P.M. to 7 A.M.,” reported one article, and the “day and night work is taken by the men alternately. The operatives demand that the working hours be reduced to ten, and their wages increased to \$1.50 per day.”¹⁸⁵ In New York, moreover, labor was more organized and less affected by seasonal dislocation than were workers in winter Cincinnati. If candle workers in Cincinnati were able to restrict the working day to daylight, as workers in the slaughtering and packing industries were, it would have represented a tremendous struggle and a considerable triumph. The evidence, however, indicates that night work was in fact the norm. In 1851, two fires, one in an Cleveland candle factory and one in a Cincinnati factory, completely destroyed the establishments, with both fires erupting at night, the Cleveland fire starting at four in the morning.¹⁸⁶ It seems likely that in the highly capitalized candle and lard oil factories of Cincinnati, employers ran the machinery as continuously as they could.

Conclusion

Recent scholarship has persuasively demonstrated that the “industrial revolution”—understood usually to mean the rapid rise of coal, steam, mills, iron, and rail—was just as much an animal-powered transformation as a mineral one. In particular, these studies have focused on

¹⁸⁵ “Meeting of the Operative Tallow Chandlers,” *New York Times*, August 29, 1853. See also, Virginia Penny, “Candles,” in *The Employments of Women: A Cyclopædia of Woman’s Work* (Boston: Walker, Wise, & Company, 1863), 391-392.

¹⁸⁶ “Fire at Cincinnati!!,” *Daily Ohio Statesman*, January 15, 1851; “Fire,” *Cleveland Herald*, August 8, 1851.

horses (and, to a lesser extent, mules), whose numbers and uses, from cities to roads to rail depots to warfare, expanded exponentially for over a hundred years before peaking in the early twentieth century. The history of horse-power and steam-power, according to this analysis, was not a case of past succumbing to future, or two competing antithetical systems, but that of a complimentary relationship. The application of animal power in the movement of goods and people increased over the nineteenth century not in spite of the expansion of rail, but because of it.¹⁸⁷

What, then, about animals that were themselves sites of production? What should we make of the millions of hogs who were transformed into lights? In one sense, what agricultural reformers like Thomas Affleck and Solon Robinson said was true: farmers were manufacturers of pork. But looked at from another perspective, farmers and drovers were merely overseers of the real work of making pork and the means of light, which was done by the hogs themselves. Farmers provided the space (the farm), but hogs were often responsible for turning over and fertilizing the fields. Farmers were responsible for procuring the raw materials of production (the corn, feed, or range), but the hogs were the ones who transformed those carbohydrates into muscle, lard, and manure. Hogs were, as they passed through and produced different times and spaces, everything from mobile pork-factories, forced migrants, and chattel; the embodiment of centuries of breeding labor, and a package of raw materials for production; trespassers, runaways, thieves, and violent territorial bands; and sometimes they were all these things at once.

Moreover, as the hogs changed shape and meaning, they were aided by the new and expanding construction of steamboats, canals, and rail reconfiguring the Ohio Valley from the

¹⁸⁷ *Industrializing Organisms: Introducing Evolutionary History*, eds. Susan R. Schrepfer and Philip Scranton (New York: Routledge, 2004); Ann N. Greene, "War Horses: Equine Technology in the American Civil War," in *Industrializing Organisms*, 143-165; Clay McShane and Joel A. Tarr, *The Horse in the City: Living Machines in the Nineteenth Century* (Baltimore: Johns Hopkins University Press, 2007).

1820s onwards. The new geography of transportation helped create the extraordinary reach and compression of humans and hogs in the spaces and times of Cincinnati (and then replicating the process in St. Louis and Chicago). And it was this space-time compression that was responsible for so revolutionizing the work of death and disassembly that awed onlookers like Frederick Law Olmsted, who gathered in Cincinnati to announce to the world the invention and perfection of the disassembly line. It bears repeating that not everyone and everywhere was unmaking hogs into pork and lights in such economies of scale and time, because they could not. They needed the compression in time and space produced by the droves, produced by the hogs against their will, to form the configurations of labor that made Cincinnati into such an important site for the creation and export of surplus value and capitalist social relations.

The death march of the hogs dramatically (re)determined the temporal topography of capital and labor in the Ohio Valley by concentrating enormous amounts of life into a narrow window of time and space. At the same time, the hogs were made to do much of the work of moving themselves to market, and all of the work of preserving their flesh from decay (both of which could have been accomplished by paid labor of butchery, packing, salting, hauling, and carting). Finally, the drive to compress the living processes of hogs—accumulated over thousands of square miles of Ohio Valley land over twelve to eighteen months—into a three month moment in Cincinnati made their living energy and matter available to capital and labor to an extent and totality that would have been impossible if their deaths were stretched over the same times and spaces of their rural lives.

These “economies of scale,” the extraordinary compression and mechanization of death work, unmade living hogs so quickly and in such numbers that their whole organisms were laid bare to processes of valuation. Instead of being just producers of pork, hogs were gathered and marched into Cincinnati death as producers also of candles, soap, lard oil, lard, brushes, and

potash; their living labor and forced convergence made possible the creation of pens, slaughterhouses, packing houses, and steam-powered factories for rendering lard, candle-making, soap-making, and more. This was what capital—always omnivorous by choice—looked like when unchecked by political compromises recognizing the rights to life of free men. Even more than the life-consuming slave labor camps of sugar plantations,¹⁸⁸ this was capital unleashed in its raw destructive fury, extinguishing not only the living labor of hogs and men in the production process, but extinguishing life itself, plundering the hogs' pasts and futures absolutely, letting not a drop of work or life escape the valuation of capital.¹⁸⁹ Or, as one visitor to the Cincinnati packing houses concluded lightly, "The pig was used up."¹⁹⁰

The effect on free labor was profound. By forcing hundreds of thousands of hogs to do work that might otherwise be done by people, horses, or steam engines, and driving them through the labor process, individual free human laborers became conduits of exponentially greater forces of living labor (freely provided energy capacity to work), and thereby amplified the value created by their labor. Cincinnati capitalists captured most of the surplus life and labor of

¹⁸⁸ Vince Brown, "Eating the Dead: Consumption and Regeneration in the History of Sugar," *Food and Foodways* 16:2 (2008): 117-126.

¹⁸⁹ The disassembly line was, as Marx anticipated, the predictably violent materialization of capital in time: "But *time* is IN FACT the active existence of the human being. It is not only the measure of human life. It is the space for its development. And the ENCROACHMENT OF CAPITAL OVER the TIME OF LABOUR is the appropriation of the *life*, the mental and physical life, of the worker." [Karl Marx, "Economic Manuscript of 1861-63, Continuation," quoted in Paul Burkett and John Bellamy Foster, "Metabolism, Energy, and Entropy in Marx's Critique of Political Economy: Beyond the Podolinsky Myth," *Theory and Society* 35 (February 2006): 127.] According to Marx, capitalists were like temporal necromancers, ever seeking to pull into the present and consume as much past and future life (labor power) as they could: "Capital asks no question about the length of life of labour-power. What interests it is purely and simply the maximum of labour-power that can be set in motion in a working day. It attains this objective by shortening the life of labour-power, in the same way as a greedy farmer snatches more produce from the soil by robbing it of its fertility," and thereby "extends the worker's production-time within a given period by shortening his life." Or, framed differently: "Capital is dead labour which, vampire-like, lives only by sucking living labour, and lives the more, the more labour it sucks. The time during which the worker works is the time during which the capitalist consumes the labour-power he has bought from him." [Marx, *Capital: A Critique of Political Economy*, Volume I (New York: Penguin, 1990), 376-377, 342.]

¹⁹⁰ "A Visit to the Mammoth Cave of Kentucky," *Fraser's Magazine* 42 (October 1850): 387.

the hogs, even willing to pay seven to ten cents more for each hog than packers in other cities,¹⁹¹ but some stuck to workers in the form of higher wages.¹⁹² The higher price paid for hogs in Cincinnati than elsewhere should also be seen as the result of both the hogs' own labor to get there and the greater lifework made available by the scale of the deathwork; a price, therefore, whereby hogs subsidized (in energy and value) the human drovers, slaughterers, packers, and by-product workers of Cincinnati. The hogs subsidized the existing economic (and power) relations of Cincinnati by making it possible for capital and free male workers to so much more thoroughly plunder the times and spaces and ecologies of the Ohio Valley for surplus value.

Cincinnati appeared to breathe in hogs and exhale pork and lard lights every winter. Through this annual cold window in time, teams of waged men and boys herded—over country roads, streams, rail, river, and city streets—hundreds of thousands of country-raised hogs from pen to pen, from farm pens to hog hotel pens, to arrival pens, to slaughterhouse pens. There, at the final terminus of the pig pen complex, other capitalist-organized teams of factory workers ushered the living hogs through systematized mass-production processes of death. From slaughterhouse to packing house to steam-powered factory, these men unmade hogs into pork and waste, and remade that waste into soap, candles, and lard oil. And as country hog life was unmade into commodified hog death in winter Cincinnati, the heterogeneous Ohio Valley geography of “prairie whales” became a homogenized part of the global economy. Here then, was a vanguard of capitalist light on the eve of the Civil War. Here were candles wrought on the front lines of industrial capital's surging expropriation of life, lard oil distilled in a crucible of space and time and death. In the Ohio Valley, struggles over the boundaries of free and slave, capital and labor, and human and animal drew bright lines in the adipose tissue of hogs.

¹⁹¹ Cronon, *Nature's Metropolis*, 229.

¹⁹² Ross, *Workers on the Edge*, 137-139.

CHAPTER FIVE

The War between the Lights: Slavery, Industry, and Fossil Fuel Lights in Western Virginia and Pennsylvania during the Civil War

The histories of light we tell today were written by the American Civil War. It might have happened differently; indeed, it was already beginning to happen differently. But so closely did the war follow on the heels of the discovery of petroleum in western Pennsylvania, and so thoroughly had kerosene and coal gas conquered urban lamps by the cessation of hostilities, that the ascent of mineral, fossil-fuel lights seemed natural, inevitable, and an obvious sign of progress. That's how it was understood then, and that's how it's been understood since. By the end of the Civil War, the geography of the means of light in the United States had been transformed so dramatically as to be almost unrecognizable. The whale fishery was crippled; camphene was nowhere and never again to be found; and instead of looking to sail and slavery for the means of light, Americans turned almost entirely to the mid-west, with its industrial, free-labor bituminous coal mines, free-labor oilfields, and free-labor steam-powered lard factories. It seemed an indisputable triumph of a free-labor, mineral-powered industrial capitalism over an organic, slave-tainted past. But if anything, this extraordinary revolution should have come as a shock, and should continue to surprise us today.

That some shift from east coast to the Appalachians would occur in the production of the means of light, and that this would take on a more mineral flavor was, indeed, more than likely, and appeared obvious to nearly all contemporary observers. But that this shift would happen so quickly, that it would center in western Pennsylvania instead of (or in addition to) western Virginia, and that slave-based turpentine would suddenly disappear from lamps while Ohio and

Illinois hogs would continue to (and even increasingly) supply light through candles and lard oil, was neither obvious nor predictable, not even after the war had begun. By taking seriously the possibility (and the demonstrable existence of) industrial slavery, this chapter explores a carbon-powered revolution in light that was steadily taking shape in the Ohio River Valley over the 1850s. It was a revolution that promised to breathe new life into both free and slave labor regimes, but was abruptly foreclosed by the sudden violence of the Civil War in favor of a far less foreseeable mode of producing light organized solely around free labor.

Let us begin with three stories: two of continuity, and one of radical change. Our attentions have, for generations, been magnetically drawn to the story of revolutionary transformation, but I would argue that this is all wrong. It was in the changes that did not quite happen, in the failed revolutions hidden behind the illusions of continuity where the real story lay.

Story One: Of Camphene and Kerosene

On a June evening in New York in 1850, camphene would claim yet another life. Having been sent down to the basement to fetch some items for her employer, a young servant woman named Isabelle Foster lit a camphene lamp as she descended the stairs. Moments later, the young woman tore shrieking into the night street, blazing like a demon. As she continued to scream in pain, a small crowd rushed to her aid, trying to extinguish the flames engulfing her from head to toe. But by the time her would-be rescuers succeeded in dousing the inferno, “nearly ever stitch of her clothing, including her shoes, were consumed.” A pair of doctors quickly did their best to treat her, but as she was carried to the City Hospital, her chances were considered slim.¹ Isabelle Foster was one more human torch kindled from the gendered ranks of servants, seamstresses, and

¹ “Accident from Camphene,” *State Gazette* (Trenton, NJ), June 6, 1850.

housewives forced by necessity to use the piney light. One more horrific immolation to stoke the public outrage at camphene, and fuel demands for a safer, affordable alternative.

Kerosene was supposed to be that alternative. Not only was it cheaper than even camphene, but advertisers claimed it was perfectly safe. “Never before,” *Scientific American* proclaimed in 1862, “have men been supplied with such a cheap fluid for producing artificial light.”² By 1860, the light of future was said to have arrived as if it were a divine gift of the earth to the United States, petroleum “flowing in some localities literally like rivers, and prepared directly in nature’s own great distillery,” and “Nature distils free of charge.”³ But in the social worlds of consumption, the more things changed, the more they stayed the same. In the 1850s, tens of thousands of outworking women had sewed men’s clothing round the clock by the dangerous light of camphene for starvation wages. Neither Civil War, kerosene, nor sewing machines would much change this during the 1860s. Instead, even more women worked even longer hours, for even lower wages, sewing clothing and knapsacks for the men of the Union Armies with lights that were just as, if not more dangerous than camphene. Indeed, while every new kerosene lamp explosion seemed to shock the news reporters, the claims that the new oil was a safe replacement for camphene proved to be utterly false.

The public outrage following the spate of explosions that began in earnest in 1861 was directed first at grocers accused of being kerosene “adulterers,” and later (and more accurately) at the manufacturers who cut corners and padded profits by failing to fully distill out the more volatile materials known as benzole and naphtha. Claims continued to be made, however, that “pure” kerosene was perfectly safe, and that all would be well if regulations for “flash point”

² “The Petroleum Region—the Rock Oil Business—The Extent and Sources of Supply,” *Scientific American*, February 22, 1862, 122.

³ Henry Enri, *Coal Oil and Petroleum: Their Origin, History, Geology, and Chemistry, with a View of Their Importance in Their Bearing upon National Industry* (Philadelphia: Henry Carey Baird, 1865), 22, 89.

testing were implemented.⁴ Yet by the 1870s, the problem only seemed to have become worse, with the United Fire Underwriters of America estimating “the total number of lamp explosions each year in this country at ten thousand,” following an earlier more conservative estimation by the Underwriters’ Association of the Northwest that “between five and six thousand people annually go hence via the kerosene route.”⁵

This was supposed to be a story of the “democratization of light.” But even with the new kerosene lamps and sewing machines “ticking all day long and far into the night,” for fourteen hours of work, women in the 1860s could only hope to make upwards of 30 cents.⁶ Most made much less. One skilled woman working by sewing machine from 7am to 9pm made four pairs of cotton drawers in a day, each pair requiring 1,800 stitches, and received 16¾ cents for the day’s work.⁷ Another woman sewing the kind of canton flannel pants used in the army was also forced “to furnish her own thread—a rule adopted by employers since the price of a spool of cotton has risen from four to eight and ten cents.” She complained to the Working Women’s Protective

⁴ “Will Kerosene Explode,” *Daily Evening Bulletin* (San Francisco), March 11, 1861; Niles Republican (March 9, 1861), “Kerosene Explosion,” *Kalamazoo Gazette*, March 15, 1861; “Fatal Result from the Explosion of a Kerosene Lamp,” *New York Tribune*, March 29, 1861; “Kerosene Explosions,” *Salem Register*, April 1, 1861; *New York Daily Tribune*, April 4, 1861: 5; “Kerosene Oil Explosive,” *New York Daily Tribune*, April 6, 1861; “Explosive Kerosene,” *Springfield Weekly Republican* (Springfield, Mass.), April 13, 1861; “How to Test Kerosene,” *Newport Mercury*, April 20, 1861; “Kerosene—Danger of Explosion,” *New York Tribune*, July 21, 1861; “Explosive Qualities of Kerosene Oil,” *North American and United States Gazette*, September 9, 1861; “Fire on a Canal Boat,” *Commercial Advertiser*, September 19, 1861; Alex. W. Blackburn, Fire Marshal, “Local Intelligence,” *Philadelphia Inquirer*, January 29, 1862; Examiner, “Coal Oils,” *Public Ledger*, February 18, 1862; “The Dangers of Our Artificial Lights,” *Scientific American*, May 4, 1867: 285; “The Sale of Explosive Illuminating Fluids,” *Scientific American*, August 20, 1870: 119; “Cleveland Non-Explosive Lamp Company’s Works—Their Importance, Extent and Benefit to the Public,” *Cleveland Leader*, February 2, 1872, p.4, in “Lamp Fillers: Notes and Queries, Quotes and News: Protection to Life and Property,” *Rushlight* 66 (June 2000): 14-17; “Insurance Companies and Under Test Oils,” *Oil, Paint and Drug Reporter* 20 (November 1881): 901-2; “Petroleum for Light,” *Scientific American*, September 15, 1883: 160; Harold F. Williamson and Arnold R. Daum, *The American Petroleum Industry: The Age of Illumination 1859-1899* (Evanston: Northwestern University Press, 1959), 523-524; Marianne Nolan and Norman Jones, “The Cleveland Non-Explosive Lamp Company: Perkins and House’s Metallic Safety Lamps,” *Rushlight* 65 (December 1999): 2-17.

⁵ “Insurance Companies and Under Test Oils,” *Oil, Paint and Drug Reporter* 20 (November 1881): 901-2.

⁶ “Sewing and Starving,” *New York Ledger*, December 12, 1863.

⁷ “The Sewing Women of New York. How Northern Philanthropy is Supported and Miscegenation Encouraged,” *Daily Age* (Philadelphia), March 23, 1864.

Union in New York that she could no longer endure the strain, saying, “ ‘I may as well starve without work, as to work and starve at the same time,’ ” while a further “inquiry revealed the fact that the wealthy firm who employed her, paid five and a half cents per pair for these drawers, of which she could make two pair per day, remarking, ‘If I get to bed about daylight and sleep two or three hours, I feel satisfied.’ ”⁸ Like thousands of other women, one older New Yorker struggled through day and night with the “coarse flannel army shirt, large size, made by hand sewing ... requiring upward of two thousand stitches. ... Younger women might make two or perhaps three in twelve hours, furnishing their own thread. This old lady occupied, with another woman, a damp, dark basement, where she strained her eyes in the day time, and sewed by the light of her neighbor’s lamp during the evening.”⁹ Others were paid starvation wages to furnish the army knapsacks equipping the Union soldiers, and “[t]hree of these knapsacks can be finished in one day by an ordinary good seamstress, working from 6 o’clock in the morning and quitting about 11 P. M. The operators furnish the thread, and receive for each complete article seven and a half cents, or twenty-two and half cents for the day’s work.”¹⁰ In Philadelphia during the war, the Quartermaster General reported that from eight to ten thousand “work people” were employed “in the manufacture of clothing and equipage” for the military.¹¹ It is probable that even more women were involved in the ready-made industry, as many of those “work people” likely subcontracted the sewing to outworking seamstresses whom would never be recorded in the Quartermaster’s figures. This would have been equally true for New York and Cincinnati, the

⁸ “The Sewing Women of New York. How Northern Philanthropy is Supported and Miscegenation Encouraged,” *Daily Age* (Philadelphia), March 23, 1864.

⁹ “The Sewing Women of New York. How Northern Philanthropy is Supported and Miscegenation Encouraged,” *Daily Age* (Philadelphia), March 23, 1864.

¹⁰ “The Sewing Women of New York,” *Daily Age*, March 23, 1864.

¹¹ *Report of the Quartermaster General of the United States Army to the Secretary of War for the Year Ending June 30, 1865* (Washington: Government Printing Office, 1865), 15.

other two major Union manufacturing centers and supply depots for ready-made military clothing.¹²

From the perspective of gender relations, the extraordinary spread of kerosene merely continued and intensified the democratization of men's exploitation of women's work and time that had begun in the antebellum era with camphene. Cascading down through the institutions of conscription, government contracting, outwork, and marriage, patriarchy was strengthened and collectivized. The Civil War enriched male clothiers and clothed male soldiers through the super exploitation of women (on the "home front"), while the temporal violence of capital and gender was disguised as self-inflicted violence in self-illuminated night-spaces—a process of mystification that also unloaded the costs and risks of time-expansion onto working women while dislocating it away from shops and into homes.¹³ At the same time, this kerosene-lit democratization of patriarchy also masked class violence, as the social relations of conscription, contracting, and war forced both working-class men and women to bear the fullest extent of the violence and risk of provisioning and fighting the Civil War, while contractors grew extraordinarily rich.¹⁴

Story Two: Stuck in the Salt

In April of 1819 an advanced guard of industrial slavery disappeared into the Blue Ridge Mountains of Virginia. Eager to expand and secure his mineral empire, Harry Heth, the leading

¹² *Report of the Quartermaster General of the United States Army* (1865), 13.

¹³ For more on the work and temporal politics of sewing women during the Civil War, see also Virginia Penny, *The Employments of Women: A Cyclopædia of Woman's Work* (Boston: Walker, Wise, & Company, 1863), 296-98, 345, 348, 351; "The Sewing Women," *New York Tribune*, December 2, 1863; "The Sewing Women and Their Employers," *Evening Post*, March 22, 1864; "Working Women," *Boston Post*, March 24, 1864; "Tremendous and Enthusiastic Meeting of Working Women," *Daily Age* (Philadelphia, PA), January 20, 1865.

¹⁴ Sven Beckert, *The Monied Metropolis: New York City and the Consolidation of the American Bourgeoisie, 1850-1896* (New York: Cambridge University Press, 1993), 111-144.

figure in the Richmond coalfields, had ordered one of his overseers to march a coffle of enslaved pit hands across the state from his Richmond coal mines to his new saltworks in the Kanawha Valley in present-day West Virginia. There, Heth had planned to force his slaves to mine some of the hundreds of thousands of tons of coal consumed each year by the furnaces of the Kanawha salt boilers. The enslaved pit hands, however, had other ideas. As Heth's overseer marched the coffle progressively deeper into the loosely policed and lightly settled forests of the Blue Ridge Mountains, it seems that the men were able to unravel the power relations holding them in slavery. First, "Billey and the 2 Johns" ran away, and made it more than sixty miles before David Street, the overseer, managed to find them. But Street soon lost them again, and then disappeared himself. Neither slaves nor driver were ever heard from again. Though thousands of others of slaves were repeatedly forced to complete the passage between these two centers of Virginian industrial slavery, at least some were able to interrupt the journey, escaping into the unindustrialized expanses separating the state's two major coalfields.¹⁵

Over forty years later, a newly freed boy named Booker picked up the journey where the fugitives had left off. Two journeys, separated by half a century, but in many ways remarkably similar. Indeed, Booker T. Washington's first taste of freedom was to be heavily seasoned with salt. The Civil War was over, the slaves had won their freedom, the world-historical revolution of the Confederacy had been defeated, and Virginia, one of the most important states in both Union and Confederacy, had been cleaved in two. Booker T. Washington's first journey in freedom, meanwhile, retraced overland paths worn by thousands of slaves driven from eastern Virginian plantations to western Virginian saltworks. "In some way, during the war, by running away and following the Federal soldiers," Washington recalled, his stepfather had "found his way

¹⁵ Ronald L. Lewis, *Black Coal Miners in America: Race, Class, and Community Conflict, 1780-1980* (Louisville: University of Kentucky Press, 1987), 7.

into the new state of West Virginia.” Whether as black soldier fighting to overthrow slavery or “contraband” deserting plantation and denying his labor to master or Confederacy, Washington’s stepfather had traveled from Franklin county, Virginia west over the Blue Ridge Mountains. And as “soon as freedom was declared, he sent for my mother to come to the Kanawha Valley, in West Virginia” where he “had already secured a job at a salt-furnace, and... a little cabin for us to live in.”¹⁶ This was likely no accident. The planters of Franklin county had, for generations, forged unusually close ties with Kanawha saltmakers by hiring out the young men they owned to work in the coal mines feeding the salt furnaces. It was an arrangement enriching both planters and saltmakers.¹⁷ And as this geography of labor determined the spatial formation of communities of the enslaved, it also shaped where and how they would carry their communities out of slavery.

It was no easy trek. “What little clothing and few household goods we had were placed in a cart, but the children walked the greater portion of the distance, which was several hundred miles.” Like for the slave coffle dispatched by Harry Heth in 1819, Washington and his family had to negotiate the terrain of friction by their own power. Long planned, but never completed, eastern and western Virginia remained unconnected by either canal or rail, and so the newly freed family journeyed on foot through woods and over mountains for several weeks, “and most of the time we slept in the open air and did our cooking over a log fire out-of-doors.” Finally, they descended into the Kanawha Valley, center of the West Virginia salt-mining industry, and reached their destination in Malden, a “little town... right in the midst of the salt-furnaces.”¹⁸

¹⁶ Booker T. Washington, *Up From Slavery: An Autobiography* (New York: Doubleday, 1907), 24-26.

¹⁷ John Edmund Stealey, III, “Slavery and the Western Virginia Salt Industry,” *Journal of Negro History* 59 (April 1974): 123-125.

¹⁸ Washington, *Up From Slavery*, 24-26.

The apparent lack of change in the region over forty years is a story that has told been before. Cotton before, cotton after. Tobacco in the seventeenth century, tobacco today. Historians love to use this trick, and the arguments they have made with it should be more than familiar. The South was stagnant. The political economies of slave societies could not tolerate industry or capitalism. The South was held back by its culture, by the absence of a Yankee work ethic and celebration of progress. Western Virginia had begun the century with salt worked by black men, and, generations later, West Virginia would enter the Union with salt worked by black men. These stories also happen to be entirely wrong.

Story Three: Petrolia

In 1859, Titusville, Pennsylvania was little more than a sleepy agricultural town with the occasional visitor interested in the strange oily substance that sometimes leaked into the streams running through the area. Later that year, Edwin Drake, who had been slowly drilling a hole into the ground in the fading hope that he might find the source of that oil, stumbled into history. Having lost the faith of his employers, the townspeople, and probably even himself, Drake was desperate and debt, and when oil started to seep out of the well head on August 28, 1859, it was the well borer, “Uncle Billy” Smith whom Drake had hired to drill his well who realized what they had done. The rush to Titusville and the region around Oil Creek was extraordinary. In a few years, Oil Creek went from quiet countryside lacking a rail connection to *the* most important site in the production of the means of light in the U.S. and the world, to *the* new epicenter in the industrial revolution of a globalizing, and increasingly monopoly capitalism. With oil derricks covering the landscape as far as the eye could see, oil spilling out of the ground and into rivers, fortunes made and lost overnight, “Petrolia” became what one historian has called a “sacrificial

landscape” in the face of capitalist excess.¹⁹ At the center of the new landscape was a city unlike the world had seen, or likely ever wanted to see. Oil City was “so impregnated with oil in all its forms and odors that it seems almost impossible to exist there to one uninitiated. In wet weather the rain mixing with the oil oozing from half a million barrels of Petroleum exported from the town forms a mud that destroys the clothes and all things with which it comes in contact.”²⁰

But while dramatic and obviously significant, the petroleum boom of Oil Creek was not particularly unlikely or surprising. Nothing in history is inevitable, but given the events and developments of the preceding decades both in the U.S. and in Europe, a coal and oil rush in western Pennsylvania taking place at some time in the mid-nineteenth century was probably more likely than not. But the same was true of western Virginia, and in the late 1850s, appeared poised to happen. The question we have really got to answer then, is not so much why was Titusville special, but what kind of industrial future was foreclosed in Charleston. Both revolutions were already on track on the eve of Civil War. But only one succeeded. If historians are really interested in change over time, we have to explain the defeats along with the victories. We have to take seriously the nearly successful emergence of a massive industrial engine of coal, oil, and slavery centered in the Kanawha Valley and bound by rail and steam to Atlantic coast and Ohio River—a new industrial landscape of coal mines, refineries, and oil wells reorienting the economic, political, and energy geography of the United States, and transforming the industrial possibilities of the Confederacy. At the very least, it should make us think differently about John Brown’s raid on Harper’s Ferry. We need to be clear about the full consequences of

¹⁹ Brian Black, *Petrolia: The Landscape of America’s First Oil Boom* (Baltimore: Johns Hopkins University Press, 2000).

²⁰ *Philadelphia Ledger* (August, 1864), quoted in Paul Sabin, “‘A Dive Into Nature’s Great *Grab-bag*’: Nature, Gender and Capitalism in the Early Pennsylvania Oil Industry,” *Pennsylvania History* 66 (Autumn 1999): 487.

the timing of the Civil War, and of the tremendous struggles of the enslaved that forced the Union to destroy slavery on what may have been the eve of its industrial revolution.

This chapter tells the story of how, during the 1850s and 1860s, three possible overlapping industrial futures in the Ohio Valley were violently, suddenly, and surprisingly reduced to a single path. The first, and in many ways most likely of these futures was that of a massive engine of industry, slavery, and coal- and oil-based illuminants centered in the Kanawha Valley of western Virginia. The second future constituted a dipolar geography that contained the first, but added to it a competing free-labor regime centered somewhere in the coal- and oil-fields feeding into Pittsburgh. The third possible future was that of a purely free-labor regime sprouting up in the oilfields one hundred miles upriver from Pittsburgh with absolutely no competition from the industrial slavery of Kanawha.

Realizing any of these futures, either in part or in whole, would have revolutionized the production of the means of light, and powerfully transformed the material and social foundations of American capitalism. Would the future of industrial capitalism in the United States, and even the world, be powered and illuminated by organic or by mineral sources or by both? And, perhaps even more importantly, would this revolution in fuel and light be based on slavery, free-labor, or a combination of the two? In many ways, the Civil War decided these questions before they even really had chance to be asked, but that should not mean we should ignore them now. If each of these were viable futures, it says something profound about the history of capitalism, about the forces and logics governing its motion, and should reveal new ways of understanding the cleavages and connections among such world-historical processes as slavery, wage-labor, industry, imperialism, and fascism. In short, it may be just as important to determine what almost happened in mid-nineteenth century American fossil-fuel energy landscapes as what actually did.

Industrial Slavery on the Border of Freedom: Salt, Coal, and Slavery in the Kanawha Valley

To that end, we must begin by demonstrating the existence, endurance, and viability of the least known, and most thoroughly defeated of these almost futures: that of industrial slavery. The history of light in the Ohio Valley was, to a surprising degree, built on a foundation of salt and slavery. Far from the saltwater worlds of whalers, salt and its manufacture shaped where, when, and how the Ohio River Valley became, in the mid-nineteenth century, the world's most important territory in the making of urban light. The salt shipped down tributary creeks and rivers to the Ohio from the western mines and wells of New York, Pennsylvania, and, most important of all, Virginia, determined and made possible the clustered population booms in humans and hogs necessary for an industrial revolution in lard-based lights. Without salt, and its ability to arrest the rate of organic decay and spoilage, a pork industry large enough to feed a burgeoning region and the hungry plantations and cities of south and east could not have been established in cities like Cincinnati, Louisville, and St. Louis. Without a large enough pork industry there would not have been a sufficient economy of scale to make the by-products of slaughter and meat-packing, of lard and tallow, into profitable industries of soap, candles, and lard oil.²¹ But the importance of salt manufacturing in the history of light did not end there. The salt regions enabling this revolution in animal lights eventually also came to incite an even greater revolution, first through an illuminating oil distilled from the coal once used primarily to fire salt boilers in Kanawha, and second, as the salt well drillers of the region stumbled upon petroleum.²²

²¹ Mark Kurlansky, *Salt: A World History* (New York: Penguin Books, 2002), 249-261.

²² Mark Kurlansky, *Salt: A World History* (New York: Penguin Books, 2002), 249-261, 310, 315; Williamson and Daum, *The American Petroleum Industry*, 14-17, 77-81.

By the time that Harry Heth's slaves and overseer disappeared along their westward journey, the Kanawha River salt industry was fast becoming one of the most critical sites in the geography of U.S. industry, and it was doing so through slaves. It was, however, still a new outpost of industrial slavery, and so western industrialists collaborated with eastern planters to form a new, mutually beneficial geography of enslaved labor. Large planters in eastern Virginia placed agents on the Kanawha to arrange hiring out their slaves to saltmakers. The contracts were usually for one-year terms (paid upon completion) starting on New Year's Day and ending on Christmas, when slaves would typically return east to their plantation communities for the holidays. Meanwhile, salt companies routinely sent representatives east to search for slaves whom planters were willing to lease.²³ With salt companies leasing slaves for common labor at rates trending upwards from a low of \$100 in the 1830s to a high of \$200 in the 1850s, eastern planters managed to realize substantial profits by hiring out some of the men and boys whom they owned. And as was the case with turpentine, the increased distance, risks, and profits of the coal-fired salt industry translated into higher rates. In the 1830s, Virginia courts heard evidence that slaves were being hired out to the Kanawha Salines at rates 25 to 30 percent higher than in eastern counties. In 1838, a letter from an eastern planter to a western saltmaker claimed that slaves who could be hired out locally for \$90 could be hired out to Kanawha for \$150.²⁴

This is not to suggest, however, that planters were somehow price-gouging saltmakers. Relocated to a tributary to the Ohio River, Virginia slaves could, and often did escape from the Kanawha Salines to Ohio, both overland and through the steamships carrying salt and coal to western markets. It was this geography of freedom and slavery that inflated the hiring price for slaves in western Virginia, a state of affairs that some Kanawha petitioners to the Virginia

²³ Stealey, "Slavery and the Western Virginia Salt Industry," 107.

²⁴ Stealey, "Slavery and the Western Virginia Salt Industry," 125-127.

General Assembly blamed on Ohio abolitionists. The inflated lease rates were market measurements of the fears of slaveholders and of the slaves' own will and power to be free, of the political networks of enslaved, free, freed, and fugitive people that continually chipped away at the chains of industrial slavery in the Kanawha Valley.²⁵ Given such a contested, expensive geography of enslaved labor at the far edge of slavery's dominion, Kanawha saltmakers, many of whom were actually from Ohio, might very well have attempted to establish an industrial free labor regime at the western border of Virginia. But they did not. Even at the highest rates, hired slaves rarely cost saltmakers more than 75 cents a day (this after factoring in food, shelter, and clothing), while the wages paid to free white workers were never less than \$1.00, and frequently rose as high as \$2.50. Indeed, whenever given the chance, Kanawha coal and salt operators replaced free workers with slave labor.²⁶ Moreover, because payment came at the *end* of the contract, these hired slaves were basically capital loans, an arrangement greatly to the saltmakers' advantage, and which undercut the bargaining position of free labor even further. Indeed, writing of the coal oil industry that would grow out the saltworks, one newspaper gloated that capitalists from abolitionist Ohio were directly bolstering industrial slavery, for "we have in our oil works, owned by citizens of free States, the hired slaves of our own citizens; thus using our labor and scattering their wages amongst the slaveholders in our very midst."²⁷

The majority of these hired slaves, moreover, were tasked with mining coal. Although many eastern planters stipulated in their contracts that their slaves should not be used in the mines, violation of these safeguards was the norm.²⁸ By the 1840s, somewhere around one

²⁵ Stealey, "Slavery and the Western Virginia Salt Industry," 118-120, 124-125.

²⁶ Lewis, *Black Coal Miners in America*, 8-9.

²⁷ "Will the Oil Works bring Money into the Country?" *Kanawha Valley Star*, October 10, 1859.

²⁸ Stealey, "Slavery and the Western Virginia Salt Industry," 115-117.

thousand slaves were employed in the coal mines of the Kanawha Valley, and almost all of them were hired.²⁹ In 1840, the state of Virginia sent Professor William Barton Rogers of the University of Virginia to survey the mineral industries of the Kanawha River. Roger reported that ninety furnaces along the river annually produced about three million bushels of salt and consumed five million bushels of coal, mined onsite by 995 miners and workmen. Even before the coal oil boom of the late 1850s, the Kanawha Valley was, according to Rogers's description, one of the most important and productive coalfields in the world, where "more than twice the coal is consumed every year than is furnished by all the coal mines of eastern Virginia put together."³⁰

Salt and coal operators made coal mines, by far the most dangerous sections of the Kanawha workscapes, into the work sites of the least powerful, and most socially disconnected of workers in the region. Operators deemed company-owned slaves too valuable to risk in the mines, and free workers far too expensive. Hired slaves, on the other hand, solved both problems. Not only were hired slaves cheaper than free workers, but if killed in a mining accident, a hired slave only cost the company the amount of work done up to that point. Despite the yearlong contracts, operators typically only paid the owners of slaves who ran away or died for the months or weeks that the slaves worked. Moreover, payment always came at the end of the term of agreement, making the system of leasing slaves an even more flexible and secure strategy for supplying labor on this industrial frontier.³¹

²⁹ Lewis, *Black Coal Miners in America*, 7-8; Stealey, "Slavery and the Western Virginia Salt Industry," 107-108; James T. Laing, "The Early Development of the Coal Industry in the Western Counties of Virginia," *West Virginia History* 27 (January 1966): 144-155; John J. Zaborney, *Slaves for Hire: Renting Enslaved Laborers in Antebellum Virginia* (Baton Rouge: Louisiana State University Press, 2012), 122-123.

³⁰ Quoted in James T. Laing, "The Early Development of the Coal Industry in the Western Counties of Virginia," *West Virginia History* 27 (January 1966): 146, fn. 19.

³¹ Stealey, "Slavery and the Western Virginia Salt Industry," 129-131.

For their part, the owners of slaves lessened their own financial risk through life insurance policies, just as had developed in the coalfields around Richmond. Indeed, while older and more securely established, the deeper, even more dangerous coal mines skirting the Atlantic actually worked in the favor of Kanawha mine operators. As correspondence among agents of the Baltimore Life Insurance Company demonstrated, insurers who were concerned about the spate of injuries and deaths in eastern mines, were more than happy to recommend policies for Kanawha coal hands. As one agent wrote, “In the Black Heath pitts near Richmond, a number of accidents have occurred from gas. As at present advice I would not recommend insurance on hands in these pits at any premium,” while in contrast, “In Kanawha in digging... coal there is no gas. There is I am informed no pitting there. This is the place where the hands of Mr. Doswell where application for policies is now before you has hired his hands. The only additional risk there is from the climate being somewhat colder than here.” The agent concluded his report to the secretary of the Baltimore Life Insurance Company with a thorough endorsement of insuring slaves working in Kanawha mines, writing, “I have thought for a long time that coal pitts are more healthy places for negroes than factories or R. Roads,” and suggested that the company “should not charge more than ¼ per cent Extra premium on coal pit hands. Insurance on negroes can only be made profitable by insuring a large number.”³²

The Workscape of the Kanawha Coalfields

Lewis Ruffner, in whose coal mine Booker T. Washington would work for a time as an emancipated boy, owned and leased at least forty-eight slaves at his saltworks in 1850, most of

³² Thomas Pollard to Henry F. Thompson, January 11, 1855, in Nancy C. Frantel, *Chesterfield County Virginia Uncovered: The Records of Death and Slave Insurance Records for the Coal Mining Industry 1810-1895* (Westminster, Md.: Heritage Books, 2008), 175-6. See also, John J. Zaborney, *Slaves for Hire: Renting Enslaved Laborers in Antebellum Virginia* (Baton Rouge: Louisiana State University Press, 2012), 128-130.

whom Ruffner would have assigned to work in his coal mines.³³ Their experiences likely mirrored Washington's, as the mines apparently changed little until decades after the war. In an account of the coal fields written in 1873, one resident of Charleston claimed that the mines were simple, safe, and easy to maintain, and that this was as true before the war as after, where the "roofs of the seams are remarkably fine and good, it being the exception when they are not. Consequently the mines require but a small amount of timber, which is always close by and ready to the hand. As an example: In July, 1872, I had occasion to go into the Old Dominion Mines, on the Kanawha, which have not been worked since 1858 or 1859. The entry at the back was not timbered at all, and yet, with the exception of a few flakes that had scaled off, I found the roof perfectly firm and solid."³⁴

Whether solidly constructed or not, the mines were still dangerous, and sometimes terrifying environments. As Booker T. Washington later wrote of Lewis Ruffner's saltworks, "[w]ork in the coal-mine I always dreaded. One reason for this was that any one who worked in a coal-mine was always unclean, at least while at work, and it was a very hard job to get one's skin clean after the day's work was over."³⁵ Coal mining was dirty labor, and it was also a form of daily underground migration, "fully a mile from the opening of the coal-mine to the face of the coal, and all, of course, was in the blackest darkness. I do not believe that one ever experiences anywhere else such darkness as he does in a coal-mine."³⁶

But unlike the deeper, gassier Richmond mines, the Kanawha River itself, with help from the advance and retreat of massive glaciers over hundreds of thousands of years, had done most

³³ Stealey, "Slavery and the Western Virginia Salt Industry," 111; Washington, *Up From Slavery*, 43.

³⁴ M. F. Maury, Jr., *The Resources of the Coal Field of the Upper Kanawha* (Baltimore: Sherwood & Co., 1873), 19.

³⁵ Washington, *Up From Slavery*, 38.

³⁶ Washington, *Up From Slavery*, 38.

of the difficult vertical work of exposing the coal faces in western Virginia. Taking advantage of the geological labor of the Kanawha, coal producers in western Virginia required considerably less capital, and avoided the risk, cost, and time of sinking mine shafts that might not even intersect the coal seams. And there was a truly extraordinary amount of coal made readily accessible by the freely provided work of river, ice, and erosion. “At the falls of Kanawha,” wrote one Kanawha newspaper, “we are informed, that upon actual examination of the several coal seams in the mountain, lying one above, another at different intervals, the aggregate thickness of the whole is one hundred and twenty feet of pure coal. Among these is the vein of cannel coal now extensively mined and manufactured into oil.”³⁷

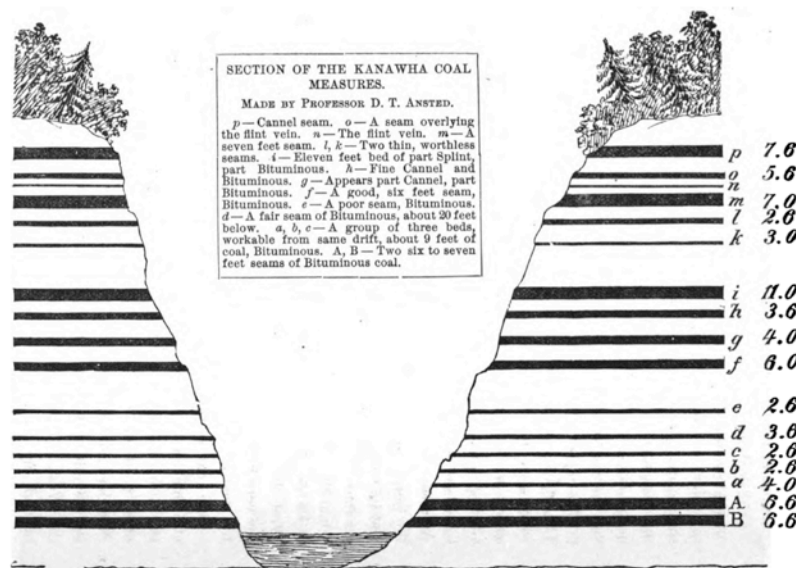


Figure 5.1. Crosscut of the Kanawha River coalfields, showing the richness and easy-access of the dry coal seams. Illustration by D. T. Ansted, in Andrew Roy, *The Coal Mines* (Cleveland, 1876), 318.

In a global market for coal, the local geology and topography of the Kanawha Valley acted as a natural subsidy to colliers. Instead of spending months boring, blasting, and pumping their way down through rock, sand, and water just to reach the coal, Kanawha coal diggers had “only” to cut horizontally into the sides of the mountains through the relatively softer coal, with

³⁷ “Internal Improvements,” *Kanawha Valley Star*, August 18, 1857.

almost all of the work directly productive of marketable commodities. Even after the war, operators continued this more “primitive” drift mining, having come nowhere close to exhausting the exposed seams lying above the water table. As one post-war report observed, “in speaking of coal, no notice has been taken of the depth at which other beds may be looked for below the water level. The fact is, that the large number of workable seams directly available above it renders it unnecessary to sink shafts at all.”³⁸

This free work of nature may have made coal mining easier for the capitalists, but whether it do so for the actual miners was a different question. One local resident claimed that before the Civil War, “It was easy to mine because it was near the surface. The first openings were small coal banks. Slaves carried the coal from the mine to the furnace in baskets.”³⁹ If carrying baskets of stone carbon weren’t “easy” enough, there was also the work of mining itself, when slaves would lie on their sides hacking under the coal face with picks. The Winifrede Mining and Manufacturing Company, like most of the coal mine operators for both salt and coal oil, forced their slave miners to labor according to centuries-old practices in a comprehensive task system. At the Winifrede mines—which were managed for New York investors and company officers who never saw more than cost-accounting entries for “coal mining”⁴⁰—mine overseers compelled slaves to pry coal from the veins using iron hand picks mounted with short steel bits. To keep track and charge of the slaves, operators instituted a task system to discipline the labor, assigning each enslaved miner a number. After hacking and loosening enough coal, each man in the Winifrede mines would shovel it into a car, “and when he loaded a car he attached a tin car

³⁸ M. F. Maury, Jr., *The Resources of the Coal Field of the Upper Kanawha* (Baltimore: Sherwood & Co., 1873), 6.

³⁹ Phil Conley, “Early Coal Development in the Kanawha Valley,” *West Virginia History* 8 (January 1947): 209.

⁴⁰ Winifred Mining and Manufacturing Company, Ledger Book, #92, 1850-58, Microfilm KAN 284 J.V.W. 386, Kanawha County Court Archives, West Virginia & Regional History Collection, West Virginia University Downtown Library, Morgantown, WV.

check bearing this number to the car so the foreman could determine each slave's daily production. The cars had wooden wheels which carried them over the wooden tracks to and from the coal bank outside. Slaves who completed their daily tasks were given supper; those who did not received a flogging instead."⁴¹ Although the Winifrede company employed mules in their mines to haul the cars back to the mouth, and maintained above-ground stables, many other companies forced the slaves under their command to move the cars with their own muscle-power.⁴² As a local resident later recalled, "My father told me that after the mines were opened, slaves would get on their hands and knees, place their heads against the small coal cars and push them in and out of the banks."⁴³

Lewis Ruffner's mines, whether deliberately planned or not, constituted a confusing underground labyrinth, as the "mine was divided into a large number of different 'rooms' or departments, and, as I was never able to learn the location of all these 'rooms,' I many times found myself lost in the mine."⁴⁴ Then, to make matters worse, and to "add to the horror of being lost, sometimes my light would go out, and then, if I did not happen to have a match, I would wander about in the darkness until by chance I found some one to give me a light."⁴⁵ Perhaps even more than the "natural" aspects of the subterranean environment, it was the environment produced through work, the workscape, that made these mines especially terrifying.

⁴¹ Lewis, *Black Coal Miners in America*, 9.

⁴² Winifrede Mining and Manufacturing Company, Ledger Book, Kanawha County Court Archives. Revealingly, the expense reports presented to the company directors at board meetings in New York contained more detailed information on the mules than on the slaves, who were never actually mentioned at all. All of the human labor was abstracted into categories like "mining coal," "opening & exploring," "repairing tracks," and "loading coal in boats," which provided no indication of whether the workers were free or enslaved, hired or owned (this information can be gleaned from other secondary sources), while a "stable account" at least demonstrated that mules were present.

⁴³ Phil Conley, "Early Coal Development in the Kanawha Valley," *West Virginia History* 8 (January 1947): 209.

⁴⁴ Washington, *Up From Slavery*, 38.

⁴⁵ Washington, *Up From Slavery*, 38.

In the mines, the “work was not only hard, but it was dangerous,” Washington recounted, where “there was always the danger of being blown to pieces by a premature explosion of powder, or of being crushed by falling slate. Accidents from one or the other of these causes were frequently occurring, and this kept me in constant fear.”⁴⁶

Given the danger and terror of the mine workspaces, it was no surprise that operators like Lewis Ruffner sometimes tried to smuggle slaves across the protective paper boundaries of contracts to work underground. The Kanawha salt industry historian John Stealey found that one “woman sued Lewis Ruffner for damages incurred when her slave, Ben, was killed in a roof fall in Ruffner’s mine. In her \$800 damage suit, the plaintiff contended that Ruffner had agreed not to employ the slave in his coal mines.”⁴⁷ With death and terror lurking in the coal dungeons on one side, and the beacon of the nearby Ohio River shining on the other, many hired slaves attempted to escape the coalfields. In 1844, when an enslaved man named Gatewood escaped from Lewis Ruffner’s coal mine, Ruffner posted an advertisement describing Gatewood as “25 or 26 years old, about 5 feet 7 inches high, tolerably black, speaks gruff when spoken too,” warning that “[t]here is reason to suppose that he is lurking about in the neighborhood, but may if not soon taken up, make for Ohio.”⁴⁸

Coal operators fought back against this geography of freedom by literally imprisoning their enslaved workers. Slaves who were hired to work in cannel coal mines alongside free white miners “were maintained in slave quarters when they were not on the job. In Mason County, which faced the Ohio River and was within sight of free soil, coal operators were forced to take extreme measures to prevent their slave workers from escaping. Thus, R.C.M. Lovell confined

⁴⁶ Washington, *Up From Slavery*, 38.

⁴⁷ Stealey, “Slavery and the Western Virginia Salt Industry,” 116.

⁴⁸ Quoted in Stealey, “Slavery and the Western Virginia Salt Industry,” 119.

his hired hands behind a stockade after work.”⁴⁹ A further indication that the practice of confining off-duty slaves was commonplace, was the fact that its absence had to be explained. When asked to testify for a case investigating a salt furnace explosion, the company owner had to clarify that at his saltworks, “the slaves stayed in a cabin 100 feet from the engine when not on duty, but that the company did not confine them there and permitted the slaves to run at-large.”⁵⁰ The intensity of surveillance and captivity likely varied from mine to mine, and with the perceived distance from free soil. There remains little doubt, however, that in an effort to combat the real and imagined alternative geographies of freedom formed by enslaved and free abolitionists working along the Ohio River, the masters of Kanawha salt furnaces and coal mines regularly attempted to transform their operations into industrial slave prison camps.

As the resort to guards and captive slave quarters demonstrated, industrial slaveholders were not all powerful. They recognized the limits of their power over their human property, and so in addition to coercive carceral practices, they also implemented a system to pay slaves directly for “overwork,” which was often done on Sunday. As one former coal bank manager recalled, “[t]he coal diggers generally dug their coal for Sunday’s run on Saturday; but it was paid for extra. It was generally hauled to the furnace on Sunday.”⁵¹ Paying for overwork was common practice across all forms of industrial slavery in the U.S., but we should be careful about reading too much into it. Giving some slaves some money for some of their work may have appeared closer to the wage relation at the heart of free labor, but it did not change the fundamental fact that slaves remained chattel, commodities to be sold. Nor did it somehow spell the gradual disappearance of slavery. In the factories and cities where slaves could earn some wages, slavery

⁴⁹ Lewis, *Black Coal Miners in America*, 9.

⁵⁰ Stealey, “Slavery and the Western Virginia Salt Industry,” 118.

⁵¹ Quoted in Stealey, “Slavery and the Western Virginia Salt Industry,” 109.

remained strong, and the small amounts of money that slaves could hope to earn through “legitimate” commerce may actually have acted more as a safety valve for whites concerned with real revolution, or real power being seized by enslaved people.⁵² If anything, we should view payments for overwork as a new tool in the coercive arsenal of slaveholders—perhaps one wrangled from slaveholders by the insistence and resistance of enslaved people, but still a part of the power structures maintained by masters to keep slaves in place and working for a free, property-owning white class.

Indeed, slave hiring was at the heart of an important transition in the political economy of labor in the United States, but not one moving towards free labor. In the Kanawha Valley, salt and coal operators were laying the foundations for a new industrial racial slavery. By separating the owner from his chattel, the system of slave hiring at once thinned the knowledge and power of owners over their human property, while empowering managers to treat the hired slaves as pure forced labor rather than living property. Unable or unwilling to know whether salt manufacturers were employing their slaves underground or at the furnace, eastern planters were ill-equipped to insist on the kind of measures and rules that would protect the lives of their property. Kanawha manufacturers, meanwhile, protected the company-owned slaves from working in the mines, or at least in the most dangerous parts, a dynamic which led hired slaves underground into dangerous coal mines, while skilled, company-owned slaves were kept above ground, and free white workers were able to further distance themselves from risk.⁵³

⁵² Robert S. Starobin, *Industrial Slavery in the Old South* (New York: Oxford University Press, 1970), 95-109; John J. Zaborney, *Slaves for Hire: Renting Enslaved Laborers in Antebellum Virginia* (Baton Rouge: Louisiana State University Press, 2012), 131-135.

⁵³ Stealey, “Slavery and the Western Virginia Salt Industry,” 124-125.

A Divided State?: The Political Economy of Transportation

In the 1830s and 1840s, a flurry of canal and railroad projects across the South helped to strengthen slavery, and stimulate slave-based industries in Virginia and elsewhere in the Old South. Built and dredged by enormous teams of slaves, and funded by state governments, these railroads and canals acted as conduits spreading and connecting both plantation and industrial forms of slavery.⁵⁴ Nevertheless, compared to the infrastructure projects in northern states like Pennsylvania and New York, Virginia's remained relatively modest, and designed more to serve the interests of eastern planters than the salt and coal manufacturers west of the Alleghenies. According to the most recent analysis, the reasons for this underdevelopment owed more to differences in political economy than to anything having to do with slavery or free labor. Simply put, Virginia's constitutions, despite several conventions and protests from western Virginians, based representation on ownership of land and slaves, rather than on the number of white male voters. This meant that eastern planters were consistently overrepresented in Virginia's General Assembly, and their interests and general suspicions of industry allowed to dominate the allocation of state resources.⁵⁵ The largest improvement project of the period, the James River and Kanawha Canal, became an almost independent agency of its own, but it never realized its name. Even after plans for connecting the two rivers by water were abandoned, funds for improving the Kanawha River (part of its mandate) were practically non-existent. Only 3 percent of the \$5.16 million of state funds expended by the James River and Kanawha Canal made it to the Kanawha region.⁵⁶

⁵⁴ Zaborney, *Slaves for Hire*, 142-148.

⁵⁵ Sean Patrick Adams, *Old Dominion, Industrial Commonwealth: Coal, Politics, and Economy in Antebellum America* (Baltimore: Johns Hopkins University Press, 2004), 84-102.

⁵⁶ Adams, *Old Dominion, Industrial Commonwealth*, 98.

The failure to complete the James River and Kanawha Canal was one factor that contributed to the decline in the 1850s of the Kanawha salt industry, and became a heated political issue for the cannel coal industry that was beginning to take its place. Even before the discovery that cannel coal could be transformed into oil, there was enormous interest in the mineral as a source of gaslight. Coal gas could be manufactured from any kind of bituminous coal, but none were better than cannel, and until the 1850s, the only source of cannel in Atlantic markets came, with tariffs, from British mines. The discovery of cannel coal along the Kanawha River in the 1850s, the largest known source of cannel in the United States, if not the world, promised to change the political economy of gaslight, if only it could easily reach the major markets. Even if a major railroad connecting Charleston to Richmond were out of the question, improvement of the Kanawha River would have greatly increased the competitiveness of Kanawha cannel in the Ohio and Mississippi markets dominated by Pittsburgh coal.⁵⁷

The Coal River and Kanawha Mining and Manufacturing Company, established in 1851 by New York City investors, dreamed of new national geography of gaslight, fueled by the slave-mined cannel coal of the Kanawha Valley. At a meeting of the board in New York City in March of 1854, one company officer excitedly reported on “the progress of the efforts to raise working capital, + stated that the Manhattan Gas Co have proposed to contract with us for Ten thousand tons of Cannel Coal delivered in this City.” This was what they had been waiting for, and the board quickly voted to appoint a committee “to negotiate with the Gas Company and other purchasers of cannel coal for terms upon which they would contract for the purchase of a certain quantity of coal including in each negotiation the price that would be paid; the time when

⁵⁷ Adams, *Old Dominion, Industrial Commonwealth*, 84-102.

required to be delivered and the advances which would be made for the outlay that would be necessary in the transportation.”⁵⁸

One week later, the board reconvened to hear the report of the committee appointed to investigate and negotiate with the officers of the two Manhattan gaslight companies and the one in Brooklyn regarding contracts for Kanawha cannel coal. They found that “the present consumption of Cannel Coal by those companies amounts, in the aggregate to about 60,000 tons, that the increase of business leads to a rapid augmentation and will probably within another year reach to that of 90 or 100,000 tons.” Up to 1854, the report noted, these companies had purchased all of their cannel coal from “European Mines at a cost delivered here, of \$12 per ton, upon contracts made some time since, and which contracts are now expiring; that a renewal of them, even to the extent of five thousand tons, cannot now be made upon the same terms, and that any considerable future supply, even at a higher price, is very problematical.” With the contracts ending, and the price of Bogshead cannel (from Scotland) rising, an excellent opportunity for western Virginian cannel companies was opening up, for the New York gas companies were “anxious to secure supplies at home, if it be possible, and would readily make contracts now for prompt delivery, at the rate of 14 or even 15 dolls per ton, to the extent of from 10,000 to 30,000 tons” on the condition that “the Coal River Mines were in a workable condition and thus prepared to commence the delivery of Coal in this City, ... and anticipate the payments upon evidence of the Coal being in barges and on its way for delivery.” The gas companies were familiar with the Coal River cannel, and considered it to be of excellent quality and value, but they remained uncertain of the current size and dependability of the supply.

According to the report, the gas company officers expressed “great anxiety ... for prompt and

⁵⁸ Coal River and Kanawha Mining and Manufacturing Company, Pvt. Acct. Book, #56, 1851-1858, Minutes, March 23, 1854, Microfilm KAN 284 J.V.W. 386, Kanawha County Court Archives, West Virginia & Regional History Collection.

energetic action on the part of the Coal River Co,” but after assurance by the agents of the mine company, the gas manufacturers pledged “that all that could be delivered would be taken by them at satisfactory and liberal prices and for cash.” This virtual promise laid the seeds of a new geography of gaslight owned and overseen by New York capital, but deeply embedded in and benefiting a political economy of industrial slavery. Here was as a proposed vision of industrial circuits running straight from the dark, slave-worked coal faces of the Kanawha Valley through New York gasworks to the gas fixtures multiplying in the factories, offices, glittering department and clothing stores, and bourgeois homes of the largest, most important city in the capitalist United States. The only problem was that it was a vision still based on a fiction of mining. And so to make fiction into fact, and thereby realize the kind of corporate partnership between mine and gasworks upon which fortunes were made, the investigatory committee, “therefore, urge the adoption of the most prompt and energetic measures to insure the speedy working of the Company’s mines to the production of at least 100,000 tons per annum.”⁵⁹

Unfortunately for the Coal River and Kanawha Mining Company, and other western Virginia cannel producers seeking lucrative contracts with northeastern gas companies, production was not the only issue. There was also the problem of transportation, and these New York contracts were put on hold pending navigational improvements and eastern rail connections in the Kanawha Valley.⁶⁰ The cannel coal companies did not give up easily, however, and they did secure a strong foothold in Ohio and Mississippi markets. The Coal River and Kanawha Mining Company spent \$10,000 during the winter of 1855-56 on dams, locks, and other improvements to the Coal River, which emptied into the Kanawha at St. Albans, about 12

⁵⁹ Coal River and Kanawha Mining and Manufacturing Company, Pvt. Acct. Book, Minutes, March 27, 1854, Kanawha County Court Archives.

⁶⁰ Otis K. Rice, “Coal Mining in the Kanawha Valley to 1861: A View of Industrialization in the Old South,” *Journal of Southern History* 31 (November 1965): 393-416.

miles downriver from Charleston.⁶¹ But with minimal improvements to the Kanawha itself, and the promised eastern rail and canal connections never seeming to materialize, the major buyers on the Atlantic seaboard began to look elsewhere for cannel. Many gas companies, meanwhile, which all charged consumers based on the volume of gas consumed, found they could actually make larger profits by substituting regular bituminous for cannel coal. Bituminous coal, which was cheaper, produced a similar volume of gas, but it was far weaker, and so to get the same amount of light, consumers had to burn much more of it. This became a major point of contention after the Civil War, when activist municipal reformers sought to challenge the practices, profits, and monopoly powers of gaslight companies.⁶²

Unsurprisingly, cannel coal companies, and their vocal supporters in at the *Kanawha Valley Star* during the 1850s were increasingly frustrated with the Virginia General Assembly. “Here, along the very banks of the Kanawha, Elk and Coal rivers,” proclaimed one editorial, “lie deep and inexhaustible veins of bituminous and cannel coal unsurpassed for variety [or] richness by the coal mines of Pennsylvania or of England.” Why, then, the editorial demanded, did so much of these mineral lands remain unworked, why did “not cannel coal of Kanawha fill the coal yards of Alexandria and Richmond and shipped thence to New York, and become the successful competitor of the Lehigh and Cumberland coal, thus enriching Virginia and making our Atlantic coast the coal yards of the Union?” Even faced with the disadvantages of navigation on an unimproved Kanawha River, the editorial continued, Kanawha coals were filling the downriver markets of Cincinnati and Louisville. So why not the rest of the nation? “Why is all this? The answer is easily given. It is because Virginia is so foolish, so very suicidal in her policy of Internal

⁶¹ Coal River and Kanawha Mining and Manufacturing Company, Pvt. Acct. Book, Minutes, May 6, 1856, Kanawha County Court Archives.

⁶² Boston City Council, Special Committee on Gas Inspection, *Report of the Evidence and Other Matter Presented before a Joint Committee of the City Council of Boston upon the Subject of Gas* (Boston: Geo. C. Rand & Avery, 1867).

Improvements, that she will not prosecute to a speedy construction the great line of railway between Covington and the Ohio, to which she now stands pledged and which Nature seems on every hand to have designated as the great artery of commerce between the Seaboard and the Valley of the Mississippi.”⁶³

Indeed, Kanawha industry boosters frequently made the case that nature intended western Virginia to be the nation’s primary source of coal, light, and industrial power, that only unnatural Pennsylvanian interference and unconscionable Virginian inaction had prevented this inevitable outcome. Another article observed pointedly that the Kanawha coal fields were around two hundred miles closer to Cincinnati than were those of Pittsburgh, “and that the Kanawha region enjoys a much milder climate than the Pittsburg region, thereby giving this region frequently a free and open navigation to Cincinnati and elsewhere, when the Ohio river is for weeks blocked up with ice, at Pittsburg. With these great natural advantages over the Pittsburg coal region, must not the Kanawha coal trade, *in course of time*, supersede the Pittsburg coal trade at all points *below the mouth of the Kanawha*?”⁶⁴

Moreover, western Virginian industrialists warned, the dangers of not helping Kanawha along its natural destiny would be worse than lost revenue and trade. A failure to bridge the eastern and western sections of the state with canal and rail, they threatened, could spell the retreat of slavery before the insidious expansion of Ohio free labor. “Is it nothing to the Old Commonwealth,” asked one editorial forebodingly, that western Virginia “should be estranged by habits of thought and political feeling from the Eastern portions of the State? Her commercial and social relations are down the river, with Cincinnati and other parts of Ohio, and much they may be rationally and geographically opposed to the popular sentiments that most odious Ohio

⁶³ From the Charlottesville Advocate, “Editorial Correspondence,” *Kanawha Valley Star*, December 23, 1856.

⁶⁴ “Cannel Coal for Boston,” *Kanawha Valley Star*, March 29, 1859.

they do and will necessarily imbibe at her polluted fountains of all social and political heresies.”⁶⁵ These warnings of abolitionism and emancipation were likely overblown, but not entirely wrong. The region around Wheeling, in the northern part of the state bordering the Ohio River, did in fact become a virtual colony of Ohio-based industrialism and agriculture, while many of the poorer whites living in the mountains began to resent not only the power slavery afforded eastern planters by the state constitution, but slavery itself. A growing number even wanted to secede from Virginia to form a new state. Kanawha salt and coal industrialists, however, never wavered from their commitment to either slave labor or to sectional unity. They did support changing the rules for representation in the General Assembly to reflect the white population, but this was more of a politically expedient tactic to secure funding than an ideological expression.⁶⁶ Kanawha reformers claimed that white representation—like the completion of the James River and Kanawha Canal and of the promised, but stonewalled Covington and Ohio railroad—would unite the Old Dominion. They envisioned industrial slavery and plantation slavery working in harmony to save the state, strengthen slavery, and more clearly advance the project of a white racial republic in an industrializing world. By 1859, it appeared that the appeals of Kanawha industrialists and the rising specter of separate statehood for an anti-slavery West Virginia had convinced the Virginia General Assembly to relent. In 1859, Virginia allocated \$300,000 to navigational improvements for the Kanawha River.⁶⁷ In 1860, the state finally began construction of the Covington and Ohio railroad.⁶⁸ Before these improvements could truly take effect, however, the Civil War violently intervened.

⁶⁵ From the Charlottesville Advocate, “Editorial Correspondence,” *Kanawha Valley Star*, December 23, 1856.

⁶⁶ Adams, *Old Dominion, Industrial Commonwealth*, 84-102.

⁶⁷ Adams, *Old Dominion, Industrial Commonwealth*, 101-102.

⁶⁸ Lewis, *Black Coal Miners in America*, 9-10.

Cannel Coal Oil

Notwithstanding all these considerable obstacles, however, a revolution in the means of light still managed to take hold in the Kanawha Valley. It is even possible that these obstacles actually helped it along. Faced with unreliable routes to markets, Kanawha coal producers did what corn growers in American hinterlands had done for generations through hogs and whiskey. They transformed cannel coal into a more concentrated and more easily shipped form called coal oil.⁶⁹ In August of 1855, the Coal River and Kanawha Mining and Manufacturing Company, having failed to secure the contracts with the New York gas companies, explored a just such an oily path to market. At a meeting of the board of directors, the company agreed to pay “to George W. Gussman one hundred dollars to defray his expenses to the Mines of this Company, for the purpose of making a preliminary report upon the expense of erecting works for the manufacture of Carbonic Hydrogen Oils from Cannel Coal.” In 1855, coal oil was still relatively unknown, but interest was rising quickly in “the manufacture of Carbonic Hydrogen Oils destined to supercede Spirits of Turpentine, Fluid + Camphene, all substances dangerous to be used of which the consumption so great in the United States (The statistics of Fire Insurance Companies show that the uses of Inflammatory substances for lights cause forty per cent of the fires).”⁷⁰ What the company wanted to know, was how much oil their mines contained. The meeting notes recorded that “Mr Gussman having tried our Cannel Coal reports that he distilled at the rate of 75 gallons of liquid matter per ton which on purification + analysis produced” 25 gallons of non-explosive oil for lamps, 8 gallons of lubricating oil, and a variety of other

⁶⁹ The oils distilled from coal were at first called both “coal-oil” and “kerosene,” but in order to avoid confusion, I have reserved the term “kerosene” to refer only to the product distilled from petroleum wells.

⁷⁰ Coal River and Kanawha Mining and Manufacturing Company, Pvt. Acct. Book, Minutes, August 15, 1855, Kanawha County Court Archives.

substances.⁷¹ This was exactly what they had hoped to learn. There were liquid fortunes congealed in the cannel coal buried in their mines.

In July of 1858, Coones, Pickett & Co., a coal oil company located 26 miles upriver from Charleston was “at present, making *two hundred gallons of oil per day in a crude state, from cannel coal,*” and with the new retorts in place, would soon be making 1,000 gallons daily, with an anticipated 40-retort, 3,000 gallons-a-day capacity expected the next spring. The market price for this oil, meanwhile, was 60 cents per gallon in New York.⁷²

According to the *Kanawha Valley Star*, “The manner of extracting the crude oil from cannel coal is very simple.” First, workmen would break up the coal into small pieces, “not larger in size than a hen’s egg,” and then place the pieces in cylindrical retorts, much like would be done in a gasworks.⁷³ Once the coal was in the retorts, the first stage of distillation took place. Heating the coal retorts to temperatures below 800°F, half as hot as they would be in a gasworks, workmen oversaw the dry, destructive distillation of the coal into volatile oils and gas (the lower temperatures compared with a gasworks were designed to produce relatively more oils and less gas).⁷⁴ After externally heating the retorts on the tops and sides, “a stream of steam, *intensely hot,* is thrown *into* each retort,” the resulting heat and pressure further distilling the coal into gas, liquid, and solid states. Pipes leading from the bottom of each retort allowed the liquids and gases to escape from the retorts, after which they were passed through water chilled pipes, like the worm of a turpentine (or whiskey) still, and separated into its various components.⁷⁵

⁷¹ Coal River and Kanawha Mining and Manufacturing Company, Pvt. Acct. Book, Minutes, August 15, 1855, Kanawha County Court Archives.

⁷² “Cannel Coal Oil,” *Kanawha Valley Star*, July 28, 1857.

⁷³ “Cannel Coal Oil,” *Kanawha Valley Star*, July 28, 1857.

⁷⁴ Williamson and Daum, *The American Petroleum Industry*, 51-52.

⁷⁵ “Cannel Coal Oil,” *Kanawha Valley Star*, July 28, 1857.

The company owners were not, however, entirely optimistic about the political economy of transportation along the Kanawha, and intended “clarifying and refining the crude oil at Maysville, Ky. The uncertainty of navigation in the Kanawha river prevents them from erecting a refining establishment in this county.”⁷⁶ So great were the anticipated profits from coal oil, however, that many other companies responded to the same problem by investing substantial sums of their own money to improve river navigation. The Coal River and Kanawha Mining and Manufacturing Company, for example, recorded in the spring of 1856 that it had “expended Ten Thousand Dollars during the past winter towards the erection of a Lock + Dam (N^o 5) on Coal River which will complete the navigation from the Company’s property to tide water + enable them to ship their products from their own Lands to any market.”⁷⁷

“The discovery of coal-oil and the invention of coal-oil lamps supply wants which have long been felt in the community,” proclaimed one editorial. Across the country, “an excellent light, in a cheap, safe, clean and convenient form, has long been a desideratum,” and coal oil was precisely that light, for “coal-oil furnishes the substance, and coal-oil lamps the means of obtaining a light as bright as gas, cheaper, in the long run, than any other light, perfectly safe, as clean as camphene, and as convenient as candles.”⁷⁸

It had not been, however, simply a process of marrying oil and lamp. Coal oil had been known of for some time, and attempts to manufacture it at scale had even been attempted in the area from at least 1854 at the Breckenridge Company of Cloverport, Kentucky. Hopes were high, for the “discovery of coal-oil was supposed to be one of the greatest of the age—and so it truly was; but an insuperable difficulty was experienced in burning it.” It was one thing to have oil. It

⁷⁶ “Cannel Coal Oil,” *Kanawha Valley Star*, July 28, 1857.

⁷⁷ Coal River and Kanawha Mining and Manufacturing Company, Pvt. Acct. Book, Minutes, May 6, 1856, Kanawha County Court Archives.

⁷⁸ “Coal-Oil and Coal-Oil Lamps,” *Daily Evening Bulletin* (San Francisco), October 11, 1859.

was quite another when no lamps existed to transform it into light. And so the Breckenridge “company had expended \$300,000 in its manufacture; but it turned out to be a dead weight on their hands. Under these circumstances, application was made by the Breckenridge Company to the firm of Dietz & Co., of New York, who were largely in the lamp business, ... and, in the course of two years and a half, made his invention of the Dietz burner, which is as important a contrivance in the history of lights as the Howe needle in that of machine-sewing.”⁷⁹

The Dietz burners, along with the similar Knapp and Drake lamps, truly did have a revolutionary effect on the coal oil industry. As one San Francisco newspaper noted, “The manufacture of coal oil, since the invention of the burner, has become quite extensive. The Breckenridge Company, of Cloverport, Kentucky, have \$300,000 invested; the Union Company, at Union, Kentucky, \$200,000; the Quincy Company, at Pittsburg, \$100,000; the Albert Company, in New Brunswick, \$300,000; and it is now extensively manufactured in England. As for lamps, Dietz & Co., of New York, have nearly \$100,000 invested in the business. All these, however, seem to be but the commencement of a mighty business in this line of industry, which is destined to assume an importance to be counted by millions instead of thousands of dollars.”⁸⁰ Another article estimated that there was already, in 1858, a demand for at the very least twenty million gallons of coal oil for light and lubrication (at least half of that for household use), requiring 165 factories to supply the demand.⁸¹ By 1860, manufacturers were producing 30,000 gallons of coal oil daily, with an annual value of \$5 million, and retail prices had dropped from \$1.25 in 1858 to 75¢ and sometimes as low as 35¢ a gallon in 1860 (cheaper than any illuminant

⁷⁹ “Coal-Oil and Coal-Oil Lamps,” *Daily Evening Bulletin* (San Francisco), October 11, 1859. Dietz was almost certainly not the first to actually invent a lamp capable of burning coal oil or kerosene. In Europe, at least, such lamps were around by 1853, sparking interest in the petroleum fields of Austrian Galicia. See Alison Fleig Frank, *Oil Empire: Visions of Prosperity in Austrian Galicia* (Cambridge: Harvard University Press, 2005), 56.

⁸⁰ “Coal-Oil and Coal-Oil Lamps,” *Daily Evening Bulletin* (San Francisco), October 11, 1859.

⁸¹ “Cannel Coal Oil,” *Kanawha Valley Star*, February 16, 1858.

except for camphene and burning fluid by volume, but comparable in terms of the real price of illumination). Meanwhile, coal-oil lamps were being mass-produced through a system of interchangeable parts, and an estimated 1.8 million burners had been sold to consumers at rates of between \$3.50 and \$8.00 a dozen, and an additional 1.8 million had been purchased by dealers.⁸²

The biggest question in the last few years of the 1850s, then, was not *would* coal oil be a boom industry, but *where* would that industry be? Would it be dominated by Boston and New York firms distilling oil from Nova Scotia and British cannels, or would it be centered in the Ohio Valley cannel coal fields around Pittsburgh, Kanawha, and Kentucky? In 1858, the older, better capitalized firms in New York and Boston still had a lead over Ohio Valley plants, but were losing ground. By February of 1860, there were over 30 coal oil refineries in the U.S. transforming 75,000 gallons of crude oil into 22,750 gallons of coal oil each day. This was the product of 60,000 bushels of cannel coal, and it was an industry that seemed poised only to continue growing.⁸³

And despite the concentration of final production and profits in larger urban centers, the geography of coal oil still tended to empower—to a greater extent than would be the case with petroleum—those who could control the landscapes of accumulation. Not only did the slave-worked mines and underdeveloped infrastructure allow western Virginian coal operators to capture a greater share of the surplus value, but the long-standing capital investments in salt and coal, coupled with the need to reduce the size and weight of the coal before it could competitively reach markets by producing crude coal oil onsite (like whiskey was to corn), meant that a larger portion of the production process took place around the mines. Unlike petroleum landscapes,

⁸² Williamson and Daum, *The American Petroleum Industry*, 55-59.

⁸³ “Coal Oil Manufacture,” *Kanawha Valley Star*, February 27, 1860.

where “nature distilled free of charge,” coal oil refiners and distributors were not able to completely dominate the geography of production. In February of 1860, the *Kanawha Valley Star* reported the total “number of workman employed in the several coal oil works in this country will reach 2,000; that of the miners engaged in mining cannel, 700 or more.—Besides this, there are a large force of men employed in making lamps, burners, wicks, chemicals, etc.”⁸⁴ By April of 1861, the paper claimed that there were five cannel coal oil factories in the county, which produced 5,000 gallons of crude oil daily.⁸⁵

Commentators recognized that the future geography of coal oil was going to revolve around cannel coal. And so finding and mapping it was of immediate concern. As one surveyor noted, coal “oil is not made from bituminous coal, strictly so called, but from the *cannel* or candle coal,” and while deposits of cannel were scattered all across the Ohio Valley, “[t]he best that I know of is found on the waters of the Big Kanawha river ... The veins of it are about six feet in thickness, and can be worked to almost any extent.”⁸⁶ There was no doubt that manufacturing coal oil from cannel was tremendously profitable “from the fact that it is made in Boston and New York out of cannel coal imported from England.” Kanawha cannels, it was hoped, would undercut the eastern refineries, “because here the coal is not to be moved, the manufacture being carried on right at the coal bank, and freight being charged only on the oil.”⁸⁷ Indeed, at the close of the 1850s, the future seemed clear and bright for the western Virginian industry: “New York capital is looking up these Kanawha coal banks, and in a few years there will grow up an

⁸⁴ “Coal Oil Manufacture,” *Kanawha Valley Star*, February 27, 1860.

⁸⁵ “Cannel Coal Oil Factories,” *Kanawha Valley Star*, April 9, 1861.

⁸⁶ Correspondence of the Springfield Republican, Gallipolis, Ohio, Dec. 5, 1859, “The Coal Oil Fields of the Ohio Valley,” *Newark Advocate* (Ohio), December 23, 1859.

⁸⁷ Correspondence of the Springfield Republican, Gallipolis, Ohio, Dec. 5, 1859, “The Coal Oil Fields of the Ohio Valley,” *New Advocate* (Ohio), December 23, 1859.

interest in that region in the coal oil manufacture, which will astonish the country. ... Its cheapness and reputation for light is now established. ... this coal field is to become the great center of production and population for the Union.”⁸⁸

Still, even with the solution of shrinking the coal into oil at the mines, there remained a problem of transportation, and coal oil manufacturers grew increasingly insistent that Virginia needed a central, east-west trunk line if the state wished to truly take advantage of this new industry. An 1857 article titled, “Internal Improvements,” tried to sell this line through a kind of geological providence. Noting that of the extraordinary “120 feet in thickness of fine coal actually measured in the Kanawha hills,” cannel coal seams constituted about one thirtieth, or a 4-5 foot thick layer 150 miles long and 50 miles wide, the article calculated that there were over 800 billion bushels of cannel coal buried around the Kanawha River, worth, at the average market price of 25¢ per bushel, over \$200 billion. “Let us, then, by the magic light (not of Aladin’s lamp) but by the real light of retorts and alembicks and chemical analysis,” the article exhorted, “turn these ‘black masses’ on which our mountains rest into oil, of which the world has great need to lubricate its rusty joints, and illuminate its dark alleys.” Estimating a yield of 2 gallons per bushel of cannel, if anything probably lower than the actual yields, the 1.67 trillion gallons of crude oil contained in the cannel coal field of western Virginia would be “oil enough, we should think, to grease and light the globe; and certainly much more than ever swam in all the whales since Jonah’s time. The value of 1,672,704,000,000 gallons of oil at the present market price of sixty cents per gallon, will amount to \$1,006,622,400,000.”⁸⁹

⁸⁸ Correspondence of the Springfield Republican, Gallipolis, Ohio, Dec. 5, 1859, “The Coal Oil Fields of the Ohio Valley,” *New Advocate* (Ohio), December 23, 1859.

⁸⁹ “Internal Improvements,” *Kanawha Valley Star*, August 27, 1857.

If the money alone were not sufficient to persuade, then surely, Kanawha industrialists believed, the impact that coal oil could have on the political economy of light in the United States should convince the Virginia General Assembly to leap forward with western railroad projects. “Why cannot our State make her rail road connexion with the Central road, and let the trade in this material go to Richmond to be refined and sold, instead of sending it to Cincinnati and New York,” asked one editorial. Not only was coal oil, the writer claimed, a limitless industry, “impossible to be overdone, for the demand must always equal the supply,” but it provided a perfect opportunity to humiliate and impoverish the hated New England whale fishery. By bringing the Kanawha Valley into a southern rail system, the writer asked, would it not be cause for celebration among all slaveholders? “Will not the whole South, our own dear people, rejoice; for your correspondent looks to see the time when the whale shall have rest from the persecution of the Yankee, and the grass grow (if the soil will permit it) in the streets of that abolition hole, the town of New Bedford, whose people expend all their wordy sympathies for the far away negro, and use the poor sailor, their own kindred flesh and blood, worse than dogs.”⁹⁰

Moreover, as boosters were happy to point out, this mode of producing light was notable not only for the oceans of oil it promised to unlock, but for its rate of exploitation, for the amount of surplus value and oil that could be produced through each worker. Comparing the operations of the whale fishery with that of the coal-oil works in Breckinridge, Kentucky, one article calculated that “[t]he present product of the Breckinridge works, is, with 30 men ... 675,000 [gallons] annually. The same number of men and the same amount of capital as the whale fishery requires, employed in the production of oil from the Breckinridge coal, would produce in

⁹⁰ An Old Subscriber, *Kanawha Valley Star*, March 3, 1857.

twelve months the enormous amount of \$275,000,000, instead of \$10,500,000 as” in the fishery.⁹¹

As with saltworks, cannel coal and coal oil companies sometimes began operations by recruiting free laborers, but they almost always replaced the workforce with enslaved workers once they were more established. The Kanawha Cannel Coal Mining and Oil Manufacturing Company, for instance, replaced free coal diggers with slaves and cut the cost of digging coal by half: from two cents per bushel to one and a half cents.⁹² Nor were slaves restricted to the mines. In 1860, at least eleven slaves were working at the oilworks of the Great Kanawha Coal and Oil Company.⁹³ Some residents seemed worried that the outside capital pouring into the coal oil industry from Ohio, New York, Boston, and Philadelphia would do little to benefit locals. In response, the *Kanawha Valley Star* reminded its readers that the social relations of production in the Valley assured that Kanawha whites would be able to share in any profits, for “we have in our oil works, owned by citizens of free States, the hired slaves of our own citizens; thus using our labor and scattering their wages amongst the slaveholders in our very midst.”⁹⁴

In 1858, J. G. Dumas, a chemist and engineer from Charleston, tried to improve upon the process by almost completely eliminating the need for direct human work in an oilworks. In labor-poor western Virginia, manufacturers hoped that Dumas’ system, along with that of hired slave hands would powerfully undercut and circumvent the power of free workers by alienating them from the production process. The *Kanawha Valley Star* reported that Dumas “prepared the Plan for the Oil Works at Peytona, and we understand it has met their approval.” The plan

⁹¹ McConnellsville Enquirer, “Oil from Coal—Wonderful Results,” *Newark Advocate* (Ohio), April 8, 1857.

⁹² Otis K. Rice, “Coal Mining in the Kanawha Valley to 1861: A View of Industrialization in the Old South,” *Journal of Southern History* 31 (November 1963): 415.

⁹³ Rice, “Coal Mining in the Kanawha Valley to 1861,” 415.

⁹⁴ “Will the Oil Works bring Money into the Country?” *Kanawha Valley Star*, October 10, 1859.

began by using rail and gravity to replace muscle power, “receiving the coal at the mines, in cars, from which it is emptied directly into a powerful crusher; the crusher is so elevated, that a car stands under it and receives the crushed coal, carrying it thence to the front of the retorts.” Even more important than the gravity machine, however, “[t]he method of carrying on the operation after it is once placed in the Retort, is much simpler than the old method, and is,” the article emphasized, “entirely self-working—that is, there is no hand-labor employed; the oil is carried from and into the different vessels required, entirely by machinery.”⁹⁵

We have to understand that in the antebellum Kanawha Valley, an “entirely self-working” oilworks was more than an example of technological progress. As industrialists along the Kanawha repeatedly seized chances to replace living labor with capital, and free labor with slaves, a new set of social relations, complete with its own internal contradictions and momentum, began to emerge in the coalfields of western Virginia. This was critically important. It meant that technological improvements, increases in efficiency, and the accumulation of capital were asymmetrically concentrated in the oilworks, displacing and subordinating human labor to mechanized production processes, while the work processes of the mines changed almost not at all. With oil factories able to produce more oil with fewer men, more slaves were needed to extract the coal, to accumulate the products of nature. As operators forced the underground and aboveground sections of the workscape of coal oil to diverge relatively and absolutely—as managers arranged to produce one through the dangerous handwork of cheap, disposable, enslaved men while making sure that the other was more and more made through the work of steam, iron, and coal—they sharpened and determined a set of divisions across capital, nature, and labor that increasingly came to define the production of light from fossilized carbon energy

⁹⁵ “Coal and Salt Works,” *Kanawha Valley Star*, September 28, 1858.

buried millions of year ago. When petroleum, with its crude oil freely “prepared directly in nature’s own great distillery,”⁹⁶ burst onto the scene a few years later, it spilled over into conflicts and categories that coal oil had already established. In other words, one cannot understand the social and environmental history of petroleum and kerosene without first understanding the ways that the history of coal oil had conditioned manufacturers to view labor, nature, and technology.

Oil Rush Interrupted

*At this rate, it will not much longer pay to fatten our staple porcine commodity for ulterior illuminating purposes. The huge unwieldy heroes of the sty, who ‘lard the lean earth’ as they walk along, must be curtailed of their rotund proportions. That which now runs to adipose must be converted into meat—for, when lard oil is no longer profitable, the demand for lard must, to a great extent, cease. Already, the market price of swine’s grease droops visibly, and if many more fat oil wells are discovered, our raisers of fat swine will find themselves in the vocative, so far as the demand for manufacturing purposes is concerned. Lard oil and star candles must yield to the advancing march of discovery, as sperm oil has gradually yielded to other materials.*⁹⁷

The story of how “Colonel” Edwin Drake’s discovery of oil in Titusville, Pennsylvania launched the world’s first oil rush to the region that became known as Oil Creek, is a well known one, told and retold in both academic and popular accounts.⁹⁸ While I will touch on the spatial and cultural politics of Oil Creek, I am primarily concerned here with a different oil boom. Shorter lived, and starting a few months after Titusville, the petroleum boom in the Kanawha Valley was nevertheless a pivotal space in the early history of petroleum from about 1859 to 1862. It was yet another example that history might have happened differently, that the politics of light

⁹⁶ Henry Enri, *Coal Oil and Petroleum: Their Origin, History, Geology, and Chemistry, with a View of Their Importance in Their Bearing upon National Industry* (Philadelphia: Henry Carey Baird, 1865), 22.

⁹⁷ The Cincinnati Commercial, “More Oil,” *Newark Advocate* (Ohio), April 5, 1861.

⁹⁸ For a comprehensive analysis of the early history of oil in Pennsylvania, the most indispensable account remains Harold F. Williamson and Arnold R. Daum, *The American Petroleum Industry: The Age of Illumination 1859-1899* (Evanston: Northwestern University Press, 1959). Other good histories include Ida M. Tarbell, *The History of the Standard Oil Company*, Volume 1 (New York: McClure, Phillips & Co., 1904); Daniel Yergin, *The Prize: The Epic Quest for Oil, Money, and Power* (New York: Simon & Schuster, 1991); Brian Black, *Petrolia: The Landscape of America’s First Oil Boom* (Baltimore: Johns Hopkins University Press, 2000); Christopher F. Jones, “Energy Landscapes: Coal Canals, Oil Pipelines, Electricity Transmission Wires in the Mid-Atlantic, 1820-1930” (PhD diss., University of Pennsylvania, 2009).

on the eve of the Civil War were moving in multiple directions without showing any clear signs of settling in any one place or in any one form. Emerging at a moment of growing sectional crisis, the impact that the production of petroleum and its distilled product, kerosene, would have on the future of slavery, free labor, and industrial capitalism in the United States was an open question. In other words, the history of petroleum, of kerosene, was a political one. Natural history may have determined where oil could be found, but it was human history that determined where, when, and how that would actually happen.

As an author for the *Kanawha Valley Star* noted in 1861, “That there is oil in this Valley, and in great quantities, has not been a secret to our citizens, for as far back as the discovery of coal, the petroleum has been gathered from the salt-wells and cisterns for the use of the coal-miners, when at work, in the coal banks, for illuminating purposes.”⁹⁹ Indeed, petroleum had seeped into the cultural landscape of places and names in western Virginia long before Titusville drew the world’s attention. According to the article, “oil may be seen at low stages of the river, in the summer season, for miles above and below this place, oozing from the banks of the river, and floating down the stream. Any of our boys, in the habit of bathing in Kanawha, will testify to the fact, as the oil is a source of annoyance to them. Again, the Great Kanawha river has been long nick-named ‘Greasy River,’ from the fact of the oil upon its surface.”¹⁰⁰

But it was a combination of the salt and coal-oil industries that propelled that oil from a cultural landscape into an industrial and economic one. The coal oil industry had not only demonstrated the value of rock oil, but had raised the capital, infrastructure, markets, and technologies necessary for distilling, distributing, and burning petroleum-based illuminants. Indeed, kerosene was, for all intents and purposes, no different than coal oil. The very word,

⁹⁹ “Great Kanawha Oil Prospects,” *Kanawha Valley Star*, March 19, 1861.

¹⁰⁰ “Great Kanawha Oil Prospects,” *Kanawha Valley Star*, March 19, 1861.

“kerosene,” had originally referred to a brand of coal oil manufactured in New York as early as 1856.¹⁰¹ Most producers believed that petroleum was just naturally occurring crude coal oil, so similar were the distillation processes, and so similar the products that could be distilled out.¹⁰²

Of even more immediate importance, however, was the accumulated knowledge, equipment, and skill of the famed salt well drillers of the Kanawha Salines. Edwin Drake, hanging around Titusville and suspicious that oil might be reached by drilling, travelled 100 miles south to Tarentum, Pennsylvania, where he recruited William A. Smith, a local salt well borer. Smith, however, was an amateur compared to the Kanawha experts. Where it took Kanawha drillers only 6-8 months to bore a 1000-foot well, it took Drake and Smith 2 years to drill a mere 70 feet.¹⁰³ Just as in Titusville, oil along the Kanawha was born of salt. “A few miles below Charleston, near the mouth of Davis’ creek, on Mr. Shelton’s farm,” began one article, “an old salt well was abandoned years ago, before our salt makers learned the art of tubing wells to keep out fresh water, oil and other matter deleterious to the manufacture of salt, because of the large quantity of oil that made its appearance on the salt water.” Oil had long been known to well borers as a source of frustration, and through “conversation with a number of well borers, some of whom have retired from the business, we learn that the greatest impediment to boring they have to contend with was oil. It seems that nearly every well they bored, they found, more or less, oil. In some instances, we are told, the oil came from the wells in large streams, and flowed into the river, where it could be seen for miles floating upon surface.”¹⁰⁴ Drake finally struck oil in Pennsylvania in August of 1859. Only a few months later, in November, the first oil

¹⁰¹ For a good overview of Abraham Gesner and the establishment of the New York Kerosene Company, see Williamson and Daum, *The American Petroleum Industry*, 44-48.

¹⁰² Williamson and Daum, *The American Petroleum Industry*, 51-54.

¹⁰³ Williamson and Daum, *The American Petroleum Industry*, 81.

¹⁰⁴ “Great Kanawha Oil Prospects,” *Kanawha Valley Star*, March 19, 1861.

well in Kanawha was in operation. And this was no backwater, minor industry. By the spring of 1861, before the Civil War interrupted production in western Virginia, the Kanawha oilfields were daily producing 800 barrels of oil compared with 1300 in Pennsylvania.¹⁰⁵ Oil Creek had a lead, but hardly an insurmountable one. At the time, it made much more sense to think of the Kanawha River and Oil Creek as simply two centers in a greater Ohio Valley oildom.

Oil was first struck in the Kanawha Valley in November, 1859, barely a few months after Titusville, but the real rush began in the spring of 1860 when oil was struck on the farm of John V. Rathbone. Interest was redoubled in December 1860, when J. C. Rathbone bored a well on the farm that pumped eight to ten thousand gallons of oil each day. The Rathbone farms “soon became a city of huts. Nothing could be seen but great piles of barrels, derricks, scaffolds, and cisterns; nothing heard but the puff of the steam-engine, and the click, click, of the drill!”¹⁰⁶ The oilfields of the Kanawha Valley, centered around the farms of the Rathbone family, were most often known as Burning Springs, which was also the name of a town famous for salt wells that caught on fire from the ignition of escaping pockets of natural gas. The oilfields were also sometimes called “Eternal Center.”

Burning Springs was located along the Little Kanawha River, which joined the Ohio at the suddenly important town of Parkersburg. With transporting and containing petroleum still the most limiting factor in both Oil Creek and Burning Springs, by March of 1861, “[t]he Parkersburg (Va.) Gazette, noticing the oil discoveries, says that two barrel factories are being built in that town, capable of turning out 400 barrels per day, and that at Burning Springs a

¹⁰⁵ Williamson and Daum, *The American Petroleum Industry*, 81.

¹⁰⁶ C. H. Shattuck, “Coal-Oil in West Virginia,” in U.S. Dept. of Agriculture, *Report of the Commission of Agriculture for the Year 1863* (Washington: Government Printing Office, 1863), 526-527.

factory is being erected to manufacture 1,000 barrels per day.”¹⁰⁷ That same month, the Virginia General Assembly passed bills incorporating the following: the Coal and Oil Company of Braxton county; the Burning Springs and Oil Line Railroad company; the Laurel Valley Oil and Coal Company, in Mason county.¹⁰⁸

Reporters traveling to Burning Springs described a rapidly improvised patchwork of transportation linkages desperately attempting to get the ancient liquid to market. Taking a boat downriver to Parkersburg in March of 1861, correspondents for the Cleveland *Plain Dealer* found that the town’s “levee was covered with barrels of oil awaiting shipment.” The barrels had been floated downriver “in flat boats from burning Springs and Rathbone wells, a distance of 35 miles, the barrels were marked ‘Eternal Centre,’ which is the name given to the oil regions on the Kanawa.” Steamers would then carry the barrels of oil accumulating on the docks of Parkersburg “to Pittsburgh, Baltimore, Cincinnati and other places,” to be distilled into kerosene.¹⁰⁹ As the gathering point for all the oil of Burning Springs, Parkersburg became a city of oil and for oil. “There is a large influx of strangers at Parkersburg from all parts of the country,” described one writer for the *Wheeling Intelligencer* that same March, noting that the new armies of “lawyers about the place night and day, do little else than make out leases. Provisions and hardware houses feel little or none of the present panic. The steamboats and the railroads are having heavy receipts from the oil interests.”¹¹⁰

But where there was movement and money and work, there was also politics, and on the Kanawha, just as on Oil Creek, the spatial politics of oil almost always revolved around

¹⁰⁷ “Virginia News,” *Alexandria Gazette*, March 22, 1861.

¹⁰⁸ “Virginia Legislature,” *Richmond Whig*, March 19, 1861.

¹⁰⁹ “Oil! Oil!! Oil!!! A Cleveland’s Account of the Virginia Oil Wells,” *Plain Dealer*, March 8, 1861.

¹¹⁰ From the *Wheeling Intelligencer*, March 8, “The Oil Excitement in Virginia—Letting of Claims,” *New York Herald*, March 11, 1861.

transportation. In March of 1861, the Kanawha River was “literally covered with flatboats and the boatmen are now on a strike. They ask two dollars a barrel for taking the grease to Parkersburg. The producers are only willing to give a dollar and fifty cents.”¹¹¹ The “hard-bitten,” “hard-drinking” rivermen and teamsters of the early oilfields turned the regions into “wild” mining-camps.¹¹² In Pithole City, an oil town along Oil Creek that rose from almost nothing to a frontier city of fifteen thousand in less than a year, at least three thousand of the inhabitants were teamsters.¹¹³ Teamsters charged \$3 a barrel to carry, while the rivermen of Oil Creek charged rates between 15¢ and \$1.00, “these skilled, hard-drinking pilots averaged between \$100 and \$200 for the trip down Oil Creek.” Freshets were crazy times, during peak periods scheduled two or three times a week, 10,000 to 20,000 barrels handled by 200 to 800 boats, towed upstream by horses and mules driven to death by the thousands. Timing and navigating freshets was enormously difficult, the crowded river usually seeing competitive pilots smash or ground at least some boats each freshet, and hundreds of gallons of oil were always lost.¹¹⁴

With thousands of teamsters, rivermen, and coopers working with and against each other to lay claim to a sizeable share of the value of the oil they moved, producers and refiners flexed their considerable muscle to try to eliminate these spatial workers. From 1860 to 1864 the total cost of getting a barrel of oil from Oil Creek to seaboard market ranged from \$8.00 to \$15.00, with over 50 percent of those costs accruing from transport.¹¹⁵ This was much more than a problem of efficiency. This was politics. The legions of clerks, capitalists, and merchants from

¹¹¹ From the *Wheeling Intelligencer*, March 8, “The Oil Excitement in Virginia—Letting of Claims,” *New York Herald*, March 11, 1861.

¹¹² Williamson and Daum, *The American Petroleum Industry*, 166.

¹¹³ Williamson and Daum, *The American Petroleum Industry*, 123.

¹¹⁴ Williamson and Daum, *The American Petroleum Industry*, 164-68, 185.

¹¹⁵ Jones, “Energy Landscapes,” 166.

which the “respectable” oil pioneers emerged—the refiners and producers—resented the teamsters’ power and despised them as a class. As one early historian of the region argued, teamsters drank hard, brawled often, worked their horses to death, and even whipped those who got in their way. Teamsters, who were “[i]ndispensable to the business became the tyrants of the region—working and brawling as suited them.”¹¹⁶ The amazing amounts of capital invested in tank cars, gathering pipelines, and rail led to the famous pipe wars. Teamsters destroyed the first pipeline by ripping it apart and threatening the pipe layers when the pipe owners offered to charge producers only \$1.00 instead of the teamsters’ \$3.00 per barrel. In March of 1866, four hundred teamsters fought to disrupt and destroy the Harley pipeline, setting fires to loading equipment and storage tanks. Detectives hired by Harley arrested the leaders of the teamsters and threw them in jail, breaking the opposition, and marking a triumph for the pipeliners. The simultaneous development of pipelines and tank cars for rail gave rail an advantage over water by further bypassing human labor, a confluence and synergy of political technics. This relationship also resonated through monopolies as both rail and pipelines increasingly consolidated themselves under larger trusts and companies, the most famous result of this flurry of combinations culminating in the Standard Oil Company.¹¹⁷

Of course, this spatial politics was still mostly in the future. Let us return our attention to Parkersburg, Virginia in 1861. Following their arrival in the new oil depot, the Cleveland journalists then traveled 22 miles on the Baltimore & Ohio Rail Road to “Patroleum station,” the flatboats carrying barrels of crude floating past them downriver in the opposite direction. The remainder of their journey would be far more difficult.¹¹⁸ A correspondent to the *Cincinnati*

¹¹⁶ Ida Tarbell, *The History of the Standard Oil Company* (1904), as cited in Jones, “Energy Landscapes,” 165.

¹¹⁷ Williamson and Daum, *The American Petroleum Industry*, 170-189.

¹¹⁸ “Oil! Oil!! Oil!!! A Clevelanders Account of the Virginia Oil Wells,” *Plain Dealer*, March 8, 1861.

Commercial wrote in the same month, “I arrived at the great eternal center of oildom on the 22d inst., after travelling over one of the worst roads you ever saw—the first eight miles by railroad to Kanawha Station, the next seven in an old fashioned stage coach, the next eight in a spring wagon, in all cases having to walk up all the mountains—the last nine miles walked entire.”¹¹⁹ “The distance from Patroleum station to ‘Eternal Centre,’” the Cleveland reporters wrote, “is eighteen miles over one of the worst roads that can be imagined. The hills are terrific, being from 400 to 1000 feet high and very steep. The party were advised that their best course was to proceed on foot. They did so, and after a toilsome day’s journey night overtook them within four miles of the ‘Centre.’”¹²⁰

As the Cleveland reporters neared Eternal Center, they encountered scores of other pilgrims destined for the oilfields. Some decided to share the work, company, and shelter of travel with the correspondents, forming a temporary migrant community, and “[b]y that time the party had increased to seventeen, a number having been overtaken on the road, who were also on foot. They all slept that night in a small log cabin.” In that log cabin, and the dozens of others like it that sheltered and structured the journeys of hundreds of people flocking to Burning Springs, travellers circulated important news of the oilfields along with cautionary tales of the limits and solutions to the practices of transporting and containing oil. That night, the correspondents “were informed that the Camden well, situated on the Rathbone farm, had ‘blown out,’ filling two flat-boats and a canoe with oil, besides all the barrels that were on hand, and that about sixty barrels ran into the Kanawa before the sudden flow could be checked.”¹²¹ Indeed, the roads to Burning Springs were as dense with people as the hills were dotted with oil derricks and the river

¹¹⁹ S. D. Collins for the Cincinnati Commercial, “More Oil,” *Newark Advocate* (Ohio), April 5, 1861.

¹²⁰ “Oil! Oil!! Oil!!! A Cleveland’s Account of the Virginia Oil Wells,” *Plain Dealer*, March 8, 1861.

¹²¹ “Oil! Oil!! Oil!!! A Cleveland’s Account of the Virginia Oil Wells,” *Plain Dealer*, March 8, 1861.

was thick with flat boats, canoes, and barrels. “The excitement is tremendous and the rush of people almost incredible,” wrote the travellers, who were “met on the hills in dozzens [sic] with knapsacks on their backs, hurrying frenziedly to the oil regions. Boring is going on along the Kanawa from Rathbone’s to Elizabethtown,—8 miles. ... Mr. Barron says that out of 78 passengers who came up the river from Parkersburgh when he did 70 were oil men.”¹²²

The sudden influx of people into rural hinterlands fast becoming a leading edge of an industrial energy frontier, transformed the Rathbone farms into a hastily constructed oil camp, into an oil landscape. By March of 1861, articles claimed the total “number engaged in the production of oil from Parkersburg to Burning Springs Run is not less than 4,000.”¹²³ The Cleveland expedition reported that “[t]he rush of people to this section is great and the accommodations very limited. The Cleveland party had to content themselves with a miserable hut, where they took their meals, having brought some provisions them. The Rathbone farm, on which all the wells in ‘Eternal Centre’ are located, embraces a tract of 500 acres.” Of the fifty wells bored on this farm, fourteen were pumping oil, “the least of which yields forty barrels per day. ... The rates for which land is leased are \$1,000 bonus per acre, \$1,000 when oil is reached, and one-third of the oil in iron bound barrels.”¹²⁴ Most of the oil, moreover, was “found at from 125 to 225 feet, for which distance the cost of boring is about \$2 per foot.”¹²⁵

Meanwhile, Camden Well, one of the first wells to draw attention to Burning Springs, was “still in successful operation. I believe it will pump 1,000 barrels per day; they have never

¹²² “Oil! Oil!! Oil!!! A Clevelander’s Account of the Virginia Oil Wells,” *Plain Dealer*, March 8, 1861.

¹²³ From the *Wheeling Intelligencer*, March 8, “The Oil Excitement in Virginia—Letting of Claims,” *New York Herald*, March 11, 1861.

¹²⁴ “Oil! Oil!! Oil!!! A Clevelander’s Account of the Virginia Oil Wells,” *Plain Dealer*, March 8, 1861.

¹²⁵ From the *Wheeling Intelligencer*, March 8, “The Oil Excitement in Virginia—Letting of Claims,” *New York Herald*, March 11, 1861.

had barrels enough to test its capacity.” From the seed of Camden Well, it seemed, the hills of Burning Springs had been transformed into an industrial forest: “All is excitement here—the click of the drill, and hurry and bustle are the order of the day.—Men have run wild made with the excitement. There is over five hundred derricks up here within sight, and more going up daily. The ground is leased nearly to the top of the mountain. ... The whole space where the oil has been found is not half a mile square.”¹²⁶

One of the most famous wells in Burning Springs was called the Lewellyn well. 103 feet deep, with no tubing in it, the moment “the drillers struck oil, a month or two ago, it began to flow and has continued to flow ever since. The hole is a four inch one and it is plugged with a long staff wound with cloth, which nearly fills the hole, allowing a play of about $\frac{1}{2}$ of an inch through which the oil is forced up.” Indeed, this well actually had to be restrained lest it produce too much oil, faster than workmen could cooper it in barrels. “Before this plug was put down the flow of oil was enormous,” learned one visitor, who was told by the workmen that original, unplugged “well threw a stream of oil to the hight [sic] of from 10 to 20 feet. Men who came to the well to plug it up rode through oil around the well which was *up to the horses knees!*” And even later, after the plugged had slowed the flow of oil, “they were filling seven barrels at a time. Seven barrels would be filled in four minutes. It is impossible for them to get barrels enough to hold the oil. It is estimated that if the plug was withdrawn altogether and the well allowed uninterrupted play it would throw *two thousand barrels of clear oil in twenty four hours!*”¹²⁷

Nor was the Lewellyn well an anomaly. As in Oil Creek, oilworkers in Burning Springs confronted oil culturally and materially as an animated force of nature, unpredictable, powerful,

¹²⁶ S. D. Collins for the Cincinnati Commercial, “More Oil,” *Newark Advocate* (Ohio), April 5, 1861.

¹²⁷ “Oil! Oil!! Oil!!! A Cleveland’s Account of the Virginia Oil Wells,” *Plain Dealer*, March 8, 1861.

and continually threatening to overflow human attempts to contain it.¹²⁸ “Mr. Braden’s well is one of the curiosities of the age,” wrote one Cincinnati correspondent, noting that the well “flows regularly at intervals of fifteen minutes flowing out some fifteen or twenty barrels at a flow.” When they first struck oil at this well, the imperfectly predictable rhythms and patterns of work of the oil itself forced the workmen to scramble in an attempt to catch up and match their own work to that of the oil. “The workmen were putting in the top of the well to conduct the oil into the vat,” the article recounted, but before they could get the top “secured it commenced blowing and forced the oil some forty feet high, the tube, scattering in every direction, and in trying to choke it down it whistled louder than a locomotive, scaring the whole neighborhood.” First came the sound and the fury. Next came a pillar of fire, the igniting geyser of oil “burning the hands of the workmen and scorching the hair and whiskers of others.” But, as these stories almost always went, the men won, or at least brought the wild well under sufficient control, so that by the time the Cincinnati reporter visited, “[t]here were four hundred and fifty barrels filled at this well on Friday, up to half-past three o’clock—all of that day’s flowing.”¹²⁹

By 1861, Burning Springs had become a second star in the constellation of Ohio Valley oil. Even with the political and economic crisis that would erupt during that year, and with Confederate guerillas terrorizing the countryside, Burning Springs well operators produced 4 million gallons of oil, “But these hopes were of short duration. The active efforts of those who had moved to the new field of labor were only well begun when the hostile shots were fired upon Fort Sumter.” With Union armies having claimed tentative control of the region, rebels destroyed the workscape rather than let it produce for their avowed enemies, and in May of 1862,

¹²⁸ Paul Sabin, “‘A Dive Into Nature’s Great *Grab-bag*’: Nature, Gender and Capitalism in the Early Pennsylvania Oil Industry,” *Pennsylvania History* 66 (Autumn 1999): 477-485.

¹²⁹ S. D. Collins for the Cincinnati Commercial, “More Oil,” *Newark Advocate* (Ohio), April 5, 1861.

“the Rathbone district was, together with all the apparatus, burned and entirely destroyed by the rebel forces under General Jones. Twenty thousand barrels of oil were burned with it.”¹³⁰ And while some producers desperately sought to hang on, the guerrillas never let up, and the Union armies never fully secured control of the oilfields. Over the course of 1863, returning guerrilla raiders destroyed 150,000 barrels of oil in Burning Springs.¹³¹

The Civil War and the Means of Light

In hindsight, the western Virginia coal oil and petroleum industries seemed doomed to fall before the destruction of the Civil War. Cut off from the Confederate armies of the east, how could this industrial outpost possibly survive? And this may have had some truth for the northern counties of what became West Virginia, but in the southern and western counties, in the Kanawha Valley, the future remained an open question for at least a few months. In March of 1861, just as the Burning Springs oilfields seemed to coming into their own, the industrialists of the Kanawha Valley debated whether to join with the Deep South cotton states of Mississippi, Alabama, Louisiana, Texas, South Carolina, Florida, and Georgia in the formation of the Confederate States of America. “All coal shipped from Western Virginia into the Southern Confederacy has to pay a tariff of 24 per cent,” the *Kanawha Valley Star* pointedly complained.¹³² And while petroleum may have provided a setback to the coal oil industry, cannel coal was not finished, and the prospects of war and tariffs might have revived it. But whether or not coal oil experienced a resurgence, raw coal was still in enormous demand both in and outside of

¹³⁰ C. H. Shattuck, “Coal-Oil in West Virginia,” in U.S. Dept. of Agriculture, *Report of the Commission of Agriculture for the Year 1863* (Washington: Government Printing Office, 1863), 528-529.

¹³¹ Adams, *Old Dominion, Industrial Commonwealth*, 215.

¹³² “Tariff on Coal,” *Kanawha Valley Star*, March 19, 1861.

gasworks, not to mention the considerable stimulus secession might provide to Burning Springs petroleum producers as the Mississippi Valley cut itself off from Pennsylvania oil.

“Ought we to go North or go South?” This was the question. Considering the new tariff, the editors of the *Kanawha Valley Star* believed the answer was clear. “If Virginia secedes and joins the Southern Confederacy,” they suggested, “coal can be shipped from the Kanawha Valley into the Southern Confederacy *free of duty*. ... Just think of it! Kanawha coal shipped to New Orleans, free of duty, and Pittsburgh required to pay 24 per cent. duty!” They argued that secession might be exactly what Virginia needed to solve all of the spatial and economic problems of industrial slavery as it was then constituted, asking rhetorically, “Is it not clearly our interest for Virginia to be a member of the Southern Confederacy? Would not the coal lands of Western Virginia be wonderfully enhanced in value were Virginia to join the Southern Confederacy? The tariff shows it plainly. Millions upon millions of dollars of capital would speedily be invested in Trans-Alleghany Virginia were Virginia to join the Confederate States. Our coal lands would become immensely valuable. Capital from Pittsburgh, and other places, would seek investment in our coal property—and coal operations on a grand scale would speedily be commenced in this portion of the State.”¹³³

What would it have meant if this vision had been realized? What if the Kanawha Valley had become the coal- and oilfields of the Confederacy? Unless we want to treat the concomitant rise of oil, democracy, and industrial monopoly capitalism as inevitable, as teleology, then we have to ask these counterfactual questions. As the history of underdevelopment in western Virginia demonstrated, the voices of industrial slavery remained dwarfed by the suspicions and vocal interests of plantations and cotton. But they were not silenced, and the war shifted the

¹³³ “What shall Western Virginia Do?” *Kanawha Valley Star*, April 9, 1861.

balance of power. As the historian John Majewski has recently argued, although initially justified as an anti-industrial, anti-modern defense of planter society, the Confederate project was quickly and increasingly seized by those who envisioned a centralized police state pursuing a fully modern industrialized economy of factories, railroads, and heavy industries based squarely upon racial slavery.¹³⁴ With white armies to fight and police, and black slaves to work fields and factories, the Confederacy might be better understood as a defeated proto-fascist revolution than an agricultural, anti-modern rebellion. The propaganda of states' rights ideology notwithstanding, the racial and class chauvinism of Confederate officials led to the formation of what Majewski notes was the most centralized and powerful state in North America until the Second World War. The Confederate state owned industries, instituted massive and draconian conscription policies, employed 70,000 civilians as bureaucrats, tax collectors, and conscription agents, and the "police power of the Confederate state was sometimes staggering."¹³⁵

There is a long tradition of viewing the Old South as static and stagnant agricultural society, and the Confederacy as a futile attempt to extend the antebellum moment.¹³⁶ But it was far worse than that. Had the Confederacy prevailed, the exploits of slave-worked industries like the enormous Tredgar Iron Works and the rapidly built up coal mines around Richmond would have been impossible to deny. Industrial slaveholders, long marginalized by planter society,

¹³⁴ John Majewski, *Modernizing a Slave Economy: the Economic Vision of the Confederate Nation* (Chapel Hill: University of North Carolina Press, 2009).

¹³⁵ Majewski, *Modernizing a Slave Economy*, 7.

¹³⁶ For arguments that southern nationalists were essentially anti-modern, anti-industrialist, and anti-government see, Eugene Genovese, *The World the Slaveholders Made: Two Essays in Interpretation* (Middletown: Wesleyan University Press, 1988), xxvi, 3-20, 95-102; Genovese, *The Slaveholders' Dilemma: Freedom and Progress in Southern Conservative Thought, 1820-1860* (Columbia: University of South Carolina Press, 1992); James M. McPherson, *Drawn with the Sword* (New York: Oxford University Press, 1996); Marc Egnal, *Divergent Paths: How Culture and Institutions Have Shaped North American Growth* (New York: Oxford University Press, 1996), 52-68, 87-101; Roger L. Ransom, *The Confederate States of America: What Might Have Been* (New York: W. W. Norton, 2005), 188-197; Robin L. Einhorn, *American Taxation, American Slavery* (Chicago: University of Chicago Press, 2006); James McCardell, *The Idea of a Southern Nation: Southern Nationalists and Southern Nationalism, 1830-1860* (New York: W. W. Norton, 1979); Lacy K. Ford Jr., *The Origins of Southern Radicalism: The South Carolina Upcountry, 1800-1860* (New York: Oxford University Press, 1988).

would almost certainly have joined the ranks of planters, politicians, and generals as Confederate heroes, and the institutional momentum of the Confederate state would almost certainly have further entrenched and celebrated a fascistic (or at least apartheid-like) system of industrial slavery. Add the practically limitless coal and oil of the Kanawha Valley into the mix, and the world-historical implications of a successful Confederacy, of an industrializing police state founded on white supremacy and racial chattel slavery become even more terrifying. This was the future that the world's greatest slave rebellion defeated. By deserting their masters by the hundreds of thousands, by slowing and stopping work by the millions, and by directly fighting against Confederate armies, enslaved men and women forced the upcountry southern whites and the Union armies fighting to defeat the Confederacy militarily into helping them wage a war to destroy slavery, and nip an emerging American fascism in the bud.¹³⁷

The Civil War also helped to violently change the possibilities of producing the means of light in the United States. The story has usually gone like this. First there was fire. Then, some other stuff. Then American whalers changed the world with whale oil, but just in the nick of time, kerosene saved the whales.

¹³⁷ W. E. B. Du Bois, *Black Reconstruction in America 1860-1880* ([1935, 1962] New York: Free Press, 1992); Armstead L. Robinson, *Bitter Fruits of Bondage: The Demise of Slavery and the Collapse of the Confederacy, 1861-1865* (Charlottesville: University of Virginia Press, 2005); Steven Hahn, "Did We Miss the Greatest Slave Rebellion in Modern History?" in *The Political Worlds of Slavery and Freedom* (Cambridge: Harvard University Press, 2009), 55-114. See also Robert S. Starobin, *Industrial Slavery in the Old South* (New York: Oxford University Press, 1970); Ronald L. Lewis, *Coal, Iron, and Slaves: Industrial Slavery in Maryland and Virginia, 1715-1865* (Westport, CT: Greenwood Press, 1979). Understanding the stakes of the Civil War this way also allows us to see that while African Americans defeated slavery in the United States, the toxic combination of racism, statism, and industrial capitalism that the Confederacy embodied did not disappear from the world, but rather transformed. Racialized industrial systems of forced labor continued in the United States through convict labor, debt peonage, and Jim Crow, while nineteenth-century imperialisms, and twentieth-century fascisms and apartheids multiplied coercive regimes of racial capitalism across the globe. See in particular, Aimé Césaire, *Discourse on Colonialism*, trans. Joan Pinkham (New York: Monthly Review Press, 1972); Cedric J. Robinson, *Black Marxism: The Making of the Black Radical Tradition*, forward by Robin D. G. Kelley ([1983] Chapel Hill: University of North Carolina Press, 2000); Dipesh Chakrabarty, *Provincializing Europe: Political Thought and Historical Difference* (Princeton: Princeton University Press, 2000).



Figure 5.2. “Grand Ball Given by the Whales in Honor of the Discovery of the Oil Wells in Pennsylvania,” *Vanity Fair*, April 20, 1861, 186.

As demonstrated in the first chapter of this dissertation, this story is false on a number of counts. When Drake's well famously struck (mineral) oil in August of 1859, and the petroleum rush began in Pennsylvania, the sperm whale fishery had already fundamentally transformed from its peak when it sat at the center of a thriving web of light. By the time oil started flowing up from American soil, the transformation of sperm whales into lubricant was practically the only process keeping voyages buoyant. The Civil War caused even this lifeline to fray to nearly nothing. From 1861 to 1865, more than fifty whale ships were captured and burned by Confederate privateers. Many others were commandeered by Union forces for the war, and twenty-four whaleships were deliberately sunk in Charleston Harbor by the Union to strangle the Confederate port.¹³⁸ Meanwhile, in 1862, the U.S. Lighthouse Board decided to replace sperm oil with lard oil, snapping the final surviving thread of whale light. And petroleum continued to flow. No, erupt is probably a better word. A spectacularly successful whaling voyage might return with close to 3000 barrels of oil, collected over a period of no less than two years. In one day, a single

¹³⁸ Eric Jay Dolin, *Leviathan: The History of Whaling in America* (New York: W. W. Norton & Company, 2007), 309-334.

Pennsylvania well yielded the same amount. In its most productive year, the whale fishery brought a little over 13 million gallons of whale and sperm oil to American shores; it took only two years for the petroleum industry to surpass that figure. And it was only the beginning. The market for oil was flooded. Prices plummeted, and kerosene exploded onto the scene as an illuminant eclipsing anything achieved by the fishery.¹³⁹

Before kerosene could achieve its destiny, however, something was going to have to be done about camphene. Here, too, the Civil War was the real agent of change, making a bloody politics of light appear in hindsight as technological inevitability. With the outbreak of war following the attack on Fort Sumter, turpentine producers found themselves virtually cut off from major markets by the Union blockade, and camphene practically disappeared from urban markets overnight.¹⁴⁰ Turpentine, the key ingredient in camphene (or “burning fluid), was devastated by the Civil War, with prices skyrocketing from 35 cents before the war to \$3.80 per gallon by 1864.¹⁴¹ From 1856 to 1861, camphene had remained the cheapest illuminant available, ranging from 45 to 65 cents per gallon. In 1860, at 47 cents per gallon, consumers burned around 15 million gallons of camphene in lamps ranging widely in size and portability. By 1862, camphene was almost nowhere to be found, and by 1864 the price had skyrocketed to \$2.15 per gallon.¹⁴² Kerosene, on the other hand, cost only 36 cents per gallon in 1862, and even

¹³⁹ Lance E. Davis, Robert E. Gallman, and Karin Gleiter, *In Pursuit of Leviathan: Technology, Institutions, Productivity, and Profits in American Whaling* (Chicago: University of Chicago Press, 1997), 363.

¹⁴⁰ Robert B. Outland, III, *Tapping the Pines: The Naval Stores Industry in the American South* (Baton Rouge: Louisiana State University Press, 2004), 123-125.

¹⁴¹ “Alcohol in the Manufactures and Arts,” S. Rep. No. 411-55, at 376 (1897).

¹⁴² *Reports of a Commission Appointed for a Revision of the Revenue System of the United States 1865-'66* (Washington: Government Printing Office, 1866), 161-162.

after taxes and wartime inflation rose only to 75 cents in 1864.¹⁴³ Given such conditions, it was no surprise that kerosene rushed in to fill the void left by camphene.

Kerosene and coal oil may have come to replace camphene, but without the destruction of the Civil War, the process would likely have been different. Kerosene was similar to camphene, but not identical, and this effected how people used them. In a plea, made decades later, by a former camphene manufacturer to repeal the tax on alcohol testified that what he “should like to have is a tax on kerosene oil or petroleum, which would bring into use again the article for which that is a substitute—burning fluid—and it would increase the requisite quantity of alcohol about fourfold.” Not only would this personally benefit him, as it “would revive the burning-fluid industry,” but, most interestingly of all, he claimed that it would be a gift to the people, for “[u]nder those circumstances they would have portable lights again.”¹⁴⁴ Apparently, kerosene lamps, with their specially designed burners, were too heavy to be portable, and some manufacturers clearly believed there was an opportunity, even decades later, to bring back camphene and give people the portable lamps they wanted. In other words, there is little or no reason to believe that kerosene, all by itself, would have completely displaced either camphene or the turpentine slave camps.

What did destroy the foundation of slavery and turpentine camps was the Civil War. At the turpentine camps he oversaw along the Fish River in Alabama, Benjamin Grist pushed the slaves under his command to keep dipping, chipping, and distilling turpentine for the rest of the summer and fall of 1861, but he was worried. It was clear that even if he could ship the products to New Orleans, he faced more considerable challenges in the turpentine camps. “I am in trubel for I never saw such times in my life,” Benjamin wrote to his cousin, James R. Grist, who was still

¹⁴³ Williamson and Daum, *The American Petroleum Industry*, 322.

¹⁴⁴ “Alcohol in the Manufactures and Arts,” S. Rep. No. 411-55, at 381 (1897).

attempting to manage his turpentine empire from Wilmington, North Carolina. Benjamin complained that the war was crushing the turpentine makers, and perhaps more ominously, was giving new hopes to the enslaved men he had carried south with him from Wilmington. “I have had more trubel with the negros this yare thank I ever had,” Benjamin wrote, claiming they were “sckary to death,” but that James need not “be afrade of the yankey giting any of our negros. I will keap them out of the way. I have my plan lade + I will stay them.”¹⁴⁵ One month later, with constant rains having made the ground “so soft we cannot hall a half a load,” and the slaves so wet that most of them had come down with colds and sore throats, Benjamin once again assured his cousin, “I shall look out for the negros + tacke care of them if the yankees lands hear.”¹⁴⁶ That fall, Benjamin Grist and his overseers made a tremendous effort to find, capture, and drive in the slaves that had run away, giving him so much “trubel,” and on October 9, 1861, he wrote that “all of the negros in at both plases except Jesper + I cannot hear a word of him.”¹⁴⁷ Like so many other turpentine operators during the war, Benjamin Grist was terrified of both his slaves and the Union armies, fears that the slaves likely encouraged. But while the turpentine industry crumbled, the slaves remained trapped in industrial slavery, and by 1862, Benjamin Grist had hired 69 of the 88 slaves in his Fish River turpentine camps to the nearby Shelby Iron Works for year-long contracts for a total of \$6234.75, or about \$125 each.¹⁴⁸ What happened to the remaining nineteen slaves is unclear.

¹⁴⁵ Benjamin Grist to James R. Grist, July 23, 1861 (Fish River), Box 4, Correspondence Series July 1861-1870, James Redding Grist Business Records, David M. Rubenstein Rare Book & Manuscript Library, Duke University.

¹⁴⁶ Benjamin Grist to James R. Grist, August 25, 1861 (Fish River), Box 4, Correspondence Series July 1861-1870, James Redding Grist Business Records.

¹⁴⁷ Benjamin Grist to James R. Grist, October 9, 1861 (Fish River), Box 4, Correspondence Series July 1861-1870, James Redding Grist Business Records.

¹⁴⁸ “Negros in 1862 sent up March 29. Hired to Shelby Iron Works at 125\$ a year,” Box 4, Correspondence Series July 1861-1870, James Redding Grist Business Records.

As turpentine producers desperately tried to move their slaves out of the camps and into other wartime industries, the Union armies steadily cut their way through the piney woods. During Sherman's march from Savannah, Georgia to Goldsboro, North Carolina, the abandoned turpentine camps became flammable, weaponized landscapes. As guides, many likely former turpentine slaves, led Union armies across plank roads, and through turpentine paths in North Carolina and Alabama, the advancing and retreating forces captured and burned thousands of barrels of resin.¹⁴⁹ On March 7, 1865, Sherman's troops halted at Station 103 on the Wilmington and Raleigh railroad, after passing "2,000 barrels of rosin on fire—a magnificent sight," likely an inferno left by retreating Confederates.¹⁵⁰ From the swampy terrain near Brunswick River Ferry on February 21, 1865, the commanding Union officer reported "there can be little doubt the rebels are evacuating. They have made immense fires, the smoke of which you must have seen, indicating that they are destroying turpentine, &c."¹⁵¹ Chauncey Curtis, a member of the 51st New York Volunteers, recalled that encamping near Newbern, North Carolina in an abandoned turpentine camp, where "the trees became saturated with pitch, and were in a highly inflammable condition. Some luckless night, on mischief bent, set fire to some of these trees and soon the entire forest was a mass of crackling flames, that not only illuminated our camp during the night but rendered it both night and day very unpleasant and difficult as a breathing place, on account of the dense smoke ... In a short time were all as black as the darkest

¹⁴⁹ For the significance of the geography of turpentine to the military history of the Civil War see: *The War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies*, Ser. 1, Vol. 14 (Washington: Government Printing Office, 1885), 559; *The War of the Rebellion*, Ser. 1, Vol. 29 (Part I) (GPO, 1890), 909-910; *The War of the Rebellion*, Ser. 1, Vol. 35 (Part II) (GPO, 1891), 302; *The War of the Rebellion*, Ser. 1, Vol. 47 (Part I) (GPO, 1895), 137, 198, 322-23, 381, 410, 413, 588, 622, 690, 698, 1021; *The War of the Rebellion*, Ser. 1, Vol. 47 (Part II) (GPO, 1895), 521; *The War of the Rebellion*, Ser. 1, Vol. 49 (Part I) (GPO, 1897), 143, 178-79, 216-19, 232-33, 698, 1049.

¹⁵⁰ *Report of the Quartermaster General of the United States Army to the Secretary of War, for the Year Ending June 30, 1865* (Washington: Government Printing Office, 1865), 601.

¹⁵¹ Major-General J. D. Cox to Major-General Schofield, Hdqrs. Third Division, Twenty-Third Army Corps, Brunswick River Ferry, February 21, 1865, in *The War of the Rebellion*, Ser. 1, Vol. 47 (Part II) (GPO, 1895), 521.

darkey in North Carolina.”¹⁵² As barrels of turpentine sat idle at blockaded ports and both Union and Confederate armies used the flammable remnants of the turpentine camps to harry foes, burn bridges, and torch the landscape, slaves in North Carolina and Alabama dealt the final blow to the geography of piney light by emancipating themselves by the thousands.

The hog-light complex, meanwhile, experienced the war far differently. Again, it might be tempting to see the Civil War as a moment of sharp transition from an organic to a mineral economy, but the story of hogs and lard-based candles tells otherwise. In truth, the dramatic changes in the ways lights were produced after the discovery of petroleum were driven much more by contests over space and political economy than by technics, *per se*. While the war devastated turpentine camps and camphene, whaleships and whale oil, the industrial deathscapes of Cincinnati and Chicago had never been busier, nor deadlier for hogs.

Southern markets may have been cut off, but the enormous demand of the Union armies for pork, soap, and candles propelled millions of hogs to death over the course of the Civil War. According to paragraph 1069 of the Army Regulations of the United States, Union soldiers were supposed to receive as part of their rations “1½ pounds of tallow, or 1¼ pounds of adamantine or 1 pound of sperm candles.”¹⁵³ How often they were supposed to receive these candles was less clear, with most articles simply listing candles and soap along with beef and pork, while one article reported the candles were furnished with “the hundred rations” of beef and bread.¹⁵⁴ Writing to his brother from camp in Tennessee, William Allen Clark realized, “I never told you the list of Rations. It is ¾ of a pound of Crackers or 1 ¼ pound of Bread perday, 1 pound of pork or 1 ¼ lb. of Beef, 1 lb. of Beans or peas to eight men per day, 1/8 of a pound of Sugar, the

¹⁵² Chauncy W. Curtis, “The Burnside Expedition to Roanoke,” (c. 1900), North Carolina Digital Collections (digital.ncdcr.gov).

¹⁵³ “Pay, Rations and Clothing of the Army,” *Albany Journal*, April 27, 1861.

¹⁵⁴ “A Word with the Volunteers,” *Salem Register*, August 29, 1861.

same of Coffee perday, a pound of soap and the same of Candles to eight men.”¹⁵⁵

Correspondence with family and friends was a central part of camp life for soldiers, and candles helped to structure the practice in time. Each evening in camp, described a writer for the *New York Evening Post*, with the “letters duly read, there succeeds a busy season of writing replies.

Candles are lighted, fires kindled, and the camp soon presents the leading features of a writing school.” Between dusk and the order for darkness, soldiers maintained paper ties to home and created new relationships, new cultures among one another through the light of candles and campfires until, “At nine o’clock ‘taps’ are beaten, when all lights are extinguished, and the soldier wraps himself up in his blanket for the night.”¹⁵⁶ One soldier wrote to his sister of girls and marriage, which were “common talk in the tents after the candles are lit until bedtime.”¹⁵⁷

Illuminated through thousands of government-issued candles, the regulated times and spaces of wartime letter writing helped to knit together a national community and a shared experience of the war.¹⁵⁸

In the army camps and the areas they moved through, processed goods like candles that were at once difficult to produce and such important parts of the rhythms of everyday life became valuable beyond their illuminating power. They became credit and currency. According to one article addressing complaints among volunteer troops about rations, regular troops “draw *all* the rations to which they are entitled,” after which “it will always be found there is a small

¹⁵⁵ William Allen Clark to George W. Clark, Camp near Boiling Spring, Rutherford Co., Tenn., May 31, 1863, in Margaret Black Tatum, “‘Please Send Stamps’: The Civil War Letters of William Allen Clark Part II,” *Indiana Magazine of History* 91:2 (June 1995): 219.

¹⁵⁶ From the Evening Post, “Soldiering in Winter Quarters. The Realities of Camp Life. Every-day Experiences of Volunteers,” *Albany Evening Journal*, January 25, 1862.

¹⁵⁷ Chauncey H. Cooke to Sister, Columbus, KY, Headquarters 25th Wisconsin Volunteers Infantry, May 3, 1863, in “Letters of a Badger Boy in Blue: Into the Southland,” *Wisconsin Magazine of History* 4:3 (March 1921): 337.

¹⁵⁸ For studies of how correspondence and camp life during the Civil War helped create a national culture, see Drew Gilpin Faust, *This Republic of Suffering: Death and the American Civil War* (New York: Knopf, 2008); Chandra Manning, *What This Cruel War Was Over: Soldiers, Slavery, and the Civil War* (New York: Knopf, 2007).

surplus of many articles, such as salt, vinegar, soap, candles, and sometimes beef, pork, or hard bread.” This surplus, moreover, “is sold, and goes to the post, company, or regimental fund.”¹⁵⁹ One soldier’s Civil War diary recorded that he and a friend “take pork, soap & candles to a stingy grocer in Alexandria & trade them for potatoes, onions & molasses.”¹⁶⁰ Officers were required to provide for themselves and their horses, but the typical practice was for officers to purchase supplies “from the regimental Commissary Sergeant, out of the rations already drawn for the men, but not distributed.” This may have given money to the regimental funds, but also led to shortages as quartermasters were only responsible for provisioning ordinary soldiers. One article complained that this practice led to the soldiers “virtually selling to the officers their surplus provisions before they knew whether there would be enough for themselves,” with the result that “I have known the men to be stinted in sugar and candles for weeks, because they had not drawn their full rations, and the officers had first taken all that they wanted.”¹⁶¹ Another published soldier’s account mentioned, “Our Sergeant bought a good ham this morning with the soap and candles that he had not drawn.”¹⁶²

By the end of the war, the enormously productive and enormously profitable by-product industry of candles (and soap) constituted the last organic light standing, led by such corporate juggernauts as Armour & Company and Procter & Gamble. In 1860, slaughters and packers killed and disassembled 434,499 hogs in Cincinnati. In 1863, they unmade 608,457.¹⁶³ Chicago’s

¹⁵⁹ “A Word with the Volunteers,” *Salem Register*, August 29, 1861.

¹⁶⁰ Isaac Lyman Taylor, Diary, October 7, 1862, in Hazel C. Wolf, “Campaigning with the First Minnesota: A Civil War Diary,” *Minnesota History* 25:3 (September 1944): 227.

¹⁶¹ “The Extra Army Ration and What Becomes of It,” *Milwaukee Daily Sentinel*, August 22, 1862.

¹⁶² “Military Affairs,” *Hartford Daily Courant*, May 6, 1861.

¹⁶³ Cincinnati Chamber of Commerce and Merchants’ Exchange, *Annual Report* (1866), 60.

rise as the worlds largest center of animal death was even more spectacular. In 1860, Chicagoans packed 151,339 hogs, far behind Cincinnati. By 1863, they would slaughter 970,264.¹⁶⁴

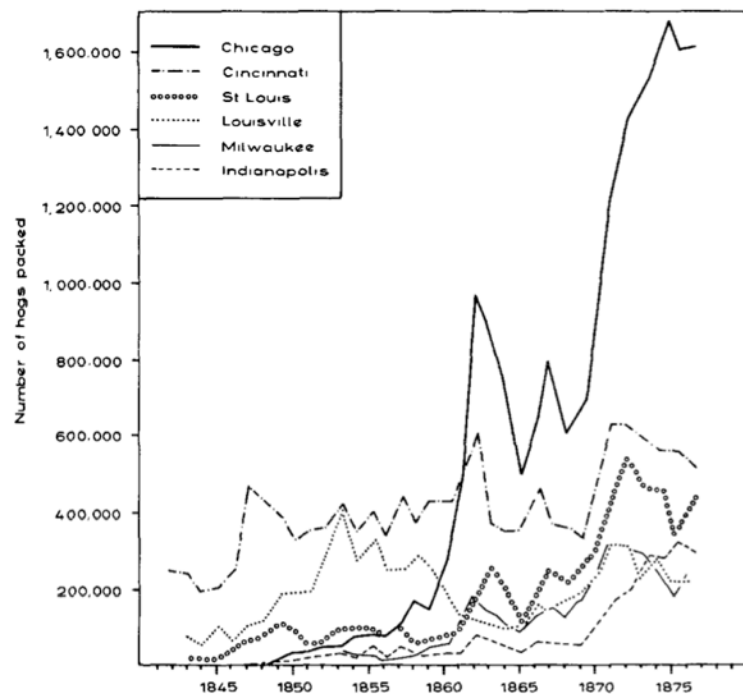


Figure 5.3. Pork Packing in the major Mid-western cities 1842-76. Source: Margaret Walsh, “The Spatial Evolution of the Mid-Western Pork Industry, 1835-75,” *Journal of Historical Geography* 4:1 (1978): 8.

Riding this surge of hog death, candle makers also turned the Civil War to their advantage. In 1850, Cincinnati exported 67,447 boxes of candles. By 1861, candles exports had risen to 138,234 boxes, but just one year later leaped to 245,997, then to 263,912 in 1863.¹⁶⁵ These export figures, moreover, were not the same as the amount manufactured, which appeared to be considerably higher when both were reported.¹⁶⁶ In 1862, while debating a new tax bill before Congress, George H. Pendleton, a representative from Cincinnati claimed that number of candles exported, 220,075 boxes, was “an amount very far below—I cannot say how

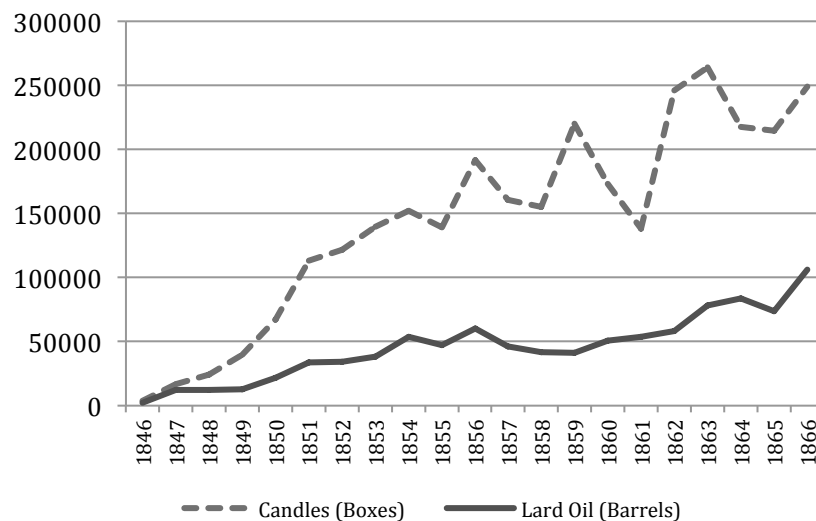
¹⁶⁴ Chicago Board of Trade, *Annual Statement* (1864), 46.

¹⁶⁵ Cincinnati Chamber of Commerce and Merchants’ Exchange, *Annual Report* (1866), 44.

¹⁶⁶ Charles Cist, *Sketches and Statistics of Cincinnati in 1859* (Cincinnati, 1859), 266.

far—the amount manufactured.”¹⁶⁷ From commercial reports, hog lights, both as candles and lard oil, appear to have been rescued by the Civil War. Hard-hit by the entrance in the late 1850s of coal oil, kerosene, and paraffin candles made from oil by-products, there was a noticeable upswing in exports in 1861.

Figure 5.4. Candles and Lard Oil Exported from Cincinnati, 1846-1866



Source: Cincinnati Chamber of Commerce and Merchants' Exchange, *Annual Report* (1866): 44, 54.

The Civil War boost to the stearine candle industry would also end up playing an important role in the early history of electric light. As will be explored more fully in the following chapter, the copper miners delving and working the massive underground hard-rock complexes through which electric transmission became possible and affordable illuminated these underground cities with millions of stearine candles until at least the First World War. Though we may want to draw clear lines between organic and mineral, past and future, the history of light proves otherwise.

¹⁶⁷ “Debate on the Tax Bill,” *Newark Advocate* (Newark, Ohio), April 25, 1862.

The Civil War was also a transformative period for gaslight. As discussed in chapter three, the antebellum history of gaslight, together with the politics around camphene, produced two uneasy alliances in the major Atlantic cities. First, there were the middle-class gas customers, upset with the power of gas companies to charge what they felt were exorbitant rates, who found allies in anti-monopoly and reformist politicians seeking to make privately owned gasworks into publically regulated, even publically owned utilities. More interesting, or at least more surprising, in many ways than the alliance of petit-bourgeois with seemingly populist politics was the second coalition, that between monopoly capital and labor. Much of the struggle was over what and who defined the “public good.” Usually excluded from or marginalized in the official political process, working-class men and women repeatedly learned over the nineteenth century that what elected city governments defined as the public good only occasionally overlapped with their own interests. What may have sometimes appeared as a battle over city governments between industrial capital and the “public,” was, in truth, often a struggle by “respectable” citizens with property and sufficient political power to keep the immigrant and working-class people who worked in the shops and factories out of “good” neighborhoods. In other words, the reformist, publically minded politics seeking to reign in, regulate, and determine fair prices for large industrial enterprises was almost always entangled in a deeply classist, racist, and nativist spatial politics.

During and after the war, these tensions would continue intensifying around gasworks. What emerged would have important consequences for industrial social relations in postwar cities. In 1866, members of the Boston City Council launched a comprehensive investigation into the Boston Gas Light Company. Over days of hearings, they heard detailed testimony suggesting that the gas company may have been inflating rates, and was almost definitely systematically thinning the illuminating power of their gas, so they could charge customers more (to get a comparable light, more gas had to be burned). At least one Alderman, Nathaniel Nash, was

outraged, accused fellow and former council members of colluding with the gas company, advocated serious public regulation, and demanded that the company start using cannel coal again to produce a better gas.¹⁶⁸ A considerable portion of the testimony in support of regulation, however, was mainly concerned with the “character” of the workmen and the disruption of repairing and laying pipe. A baker living next to the gasworks complained that not only did the ash and fumes from the factory ruin his house and dirty everything inside, but “in that particular vicinity I am the only American that lives there. ... The other people are principally laboring men; most of the work in the gas house, and of course they wouldn’t complain of it. All of them work there, in fact, except when you get farther up the street.” With Irish laborers moving in and wealthier residents moving out, the remaining baker saw the battle to keep his neighborhood properly American was being lost, and “I found that the responsibility fell on me. The old inhabitants had kind of given it up. They had fought it in old times, and considered that they had fought it enough.”¹⁶⁹ A landlord who owned 15 houses around the gasworks complained that the smoke drove away good Americans such that “I have lost by the gas works lately, \$1,000 to \$1,500 from rents. Almost every Yankee that was down there has left, except Mr. Giles,” the gas workmen’s boss. Under cross examination, the landlord elaborated upon his distress. First, the gas company seemed to be above the law: “If a woman throws a dish of water into the street, she is sure to be complained of and prosecuted, when the gas works will pump their tar water and let it run in the street by my store down to the sewer, and they are not prosecuted.” Second, and perhaps even more offensive to the landlord, the workers shared in the company’s apparent legal immunity: “The workmen and the bosses, part of them, make their brags that the City

¹⁶⁸ Boston City Council, Special Committee on Gas Inspection, *Report of the Evidence and Other Matter Presented before a Joint Committee of the City Council of Boston upon the Subject of Gas* (Boston: Geo. C. Rand & Avery, 1867).

¹⁶⁹ Boston City Council, *Report ... upon the Subject of Gas*, 193-97.

Government has shares there, and they can do just as they please. ... Mr. Giles is the great cause of complaint so far as the character of the workmen is concerned. I have known them to go out and knock a man down on the bridge, rob him of his papers and money, and then some of the bosses would go their bail, and the next day they will be at work again. I will refer to the books and show you where thirty men have been dismissed for misdemeanors and taken back again. That is the class of people that is kept there ... the harlots, the thieves, and the gas works.”¹⁷⁰

While many may have despised the workers of the gas company, seeking to pair images of industrial pollution and foreign cultural contamination, both the workingmen and their employers recognized their power was real. Much of the hearing was devoted to determining the cost of labor. Revealingly, to calculate the “true” cost of manufacture, the committee looked to the city prison’s gasworks, which were worked solely by unpaid prisoners.¹⁷¹ Industrial slavery may have been the fantasy of both engineers and public officials, but gasworks managers conceded that this was not possible, and “we have to us a great deal of skilled labor in making gas,—very expensive labor.”¹⁷²

Gasworkers, however, understood that the fear they inspired in xenophobic and middle-class Americans was nothing compared to their fear of a dark city, and they grew increasingly confident in flexing their muscle in the fearscape produced through gaslight. While striking railroad mechanics struggled unsuccessfully for days during February of 1853 to make any progress with the Baltimore and Ohio Rail Road, and other mechanics in Baltimore joined the strike in failure, the “employees at the gas works struck to day for 15 per cent. advance, which

¹⁷⁰ Boston City Council, *Report ... upon the Subject of Gas*, 213, 215.

¹⁷¹ Boston City Council, *Report ... upon the Subject of Gas*, 182-185.

¹⁷² Boston City Council, *Report ... upon the Subject of Gas*, 318.

was immediately accorded to them.”¹⁷³ In November of 1862, four hundred Irish laborers employed at the two major gas manufacturers in New York City struck for higher wages. According to the *New York Times*, the gas companies “readily complied with their demand, and it was supposed that the difficulties were all amicably arranged, and the workmen—some four hundred in number—would all return to their duty.” Again, it appeared that gasworkers, positioned at the heart of an industrial system upon which so much money and fear were heaped, wielded unusual power over their wages. But apparently something went wrong, and the Manhattan Gas Works discharged all their Irish workers and replaced them with Germans. Perhaps the Irish workers had overreached, or perhaps the gas companies saw a chance to break some of the power of labor by playing off ethnic divisions. Instead of returning to work, the Irish workmen at the other gasworks formally organized and began a militant strike, barring others from entry and attacking the German men trying to work at the Manhattan Gas Company. The police were called, and the strikers retreated, and for the time it seemed that the gas companies had won.¹⁷⁴ Following the war, in July of 1868, six hundred firemen at the Philadelphia Gas Works struck for a 25 percent increase in their wages, plunging the city into darkness. For three days the company resisted, and while the fears of dark anarchy remained unrealized, the workers remained organized and undivided. The company finally relented and gave in to the workers’ demands.¹⁷⁵

¹⁷³ “The Mechanics Strike in Baltimore,” *New York Daily Times*, February 17, 1853.

¹⁷⁴ “A Strike Among the Employes of the Gas Companies. A Large Police Force Called Out—A Serious Riot Apprehended,” *New York Times*, November 13, 1862; “The Late Strike at the Gas Works,” *New York Times*, November 17, 1862; “The Late Strike at the Manhattan Gas Works—An Action for False Imprisonment,” *New York Times*, December 17, 1862.

¹⁷⁵ “Strike at the Philadelphia Gas Works—The City in Darkness,” *New York Times*, July 17, 1868; “The Strike in the Philadelphia Gas Works—The City in Darkness,” *New York Times*, July 18, 1868; “The Gas Strike in Philadelphia—The Strikers Victorious,” *New York Times*, July 19, 1868.

Finally, kerosene. As the Civil War crippled the whale fishery and the turpentine camps, gave a boon to hog lights, and multiplied the tensions and production of monopoly gasworks, kerosene refiners were beginning to seize control over the spatial politics of the tremendously productive oilfields of northwestern Pennsylvania. Indeed, so important and so productive were these oilfields, that many in the North interpreted petroleum as divine proof of the justice of their cause. The very moment that cotton, the backbone of U.S. manufacturing and exports disappeared, petroleum flowed in to make up for any loss of trade.¹⁷⁶ The Philadelphia *Public Ledger* published an article in 1862 titled, “Petroleum Oil as Valuable as Cotton,” touting an English market circular predicting “that if the rocks and wells of Pennsylvania, Canada and other districts continue their exudation at the present rate of supply, the value of the trade in this oil may even equal American cotton.”¹⁷⁷ The most famous story here is the rise of John Rockefeller and the pipelines, that allowed him and his Standard Oil Company to break the power of the teamsters, set freight rates, and determine the price of both crude and refined oil. This is an oft told story, and I will not go into more detail here.¹⁷⁸

A process begun by camphene, kerosene merely amplified the social relations and tensions of an incredibly flammable landscape of cheap and democratically available light. In just eleven months, from May, 1861 to April, 1862, there were at least 16 separate fires and explosions in at least 14 different kerosene oil refineries (most of which occurred in New York City, Brooklyn, Williamsburg, and Jersey City), killing dozens and destroying tens of thousands of

¹⁷⁶ Daniel Yergin, *The Prize: The Epic Quest for Oil, Money, and Power* (New York: Simon & Schuster, 1991), 30.

¹⁷⁷ “Petroleum Oil as Valuable as Cotton,” *Public Ledger*, February 3, 1862.

¹⁷⁸ For more on the rise of Standard Oil and the spatial politics of oil landscapes, see Williamson and Daum, *The American Petroleum Industry*; Jones, “Energy Landscapes.”

dollars-worth of kerosene and petroleum.¹⁷⁹ Meanwhile, docks, storage depots, and even grocers became routine settings for kerosene explosions that could become truly horrific.¹⁸⁰ Describing a 3,000-barrel fire in Pittsburgh at the Duquesne depot of the Pennsylvania Rail Road, one article claimed so intense was the fire, “All the water of the Niagara turned upon it would have been without effect.”¹⁸¹

Forced to survive in this new, but, after camphene, all too familiar geography of light, people developed new strategies for knowing and living with explosive lights. Catherine Beecher, and Harriet Beecher Stowe advised women to carefully prepare and test all the kerosene they brought into their homes before ever pouring it into a lamp. “Good kerosene oil should be purified from all that portion which boils or evaporates at a low temperature,” the contended, “for it is the production of this vapor, and its mixture with atmospheric air, that gives rise to those terrible explosions which sometimes occur when a light is brought near a can of poor oil.” In order to perform the all-important test of new oil, they strongly recommended that women

¹⁷⁹ “Fire in Stanton Street,” *New York Herald*, May 15, 1861; “Fire in Stanton Street,” *Commercial Advertiser*, July 16, 1861; “Destruction of a Kerosene Refinery,” *Commercial Advertiser*, August 27, 1861; “Destruction of a Kerosene Factory,” *Commercial Advertiser*, September 5, 1861; “Another Kerosene Factory Burned,” *Philadelphia Inquirer*, September 27, 1861; “Brooklyn. Fire,” *Commercial Advertiser*, September 27, 1861; “Destructive Fire at Red Hook.—A Kerosene Oil Factory Destroyed.—Loss \$30,000,” *Commercial Advertiser*, September 28, 1861; “Fires,” *New York Daily Tribune*, September 28, 1861; “Destructive Fire in Jersey City,” *Commercial Advertiser*, October 16, 1861; “Fire at Hunter’s Point,” *Commercial Advertiser*, October 17, 1861; “A Kerosene Oil Factory Destroyed by Fire,” *New York Daily Tribune*, November 6, 1861; “Arrest for Manufacturing Kerosene Oil without a License,” *Commercial Advertiser*, December 9, 1861; “Another Explosion a Kerosene Oil Factory. Destruction of the Newton Creek Works—Loss, \$120,000,” *Albany Evening Journal*, December 28, 1861; “Brooklyn. Another Explosion in a Kerosene Oil Factory,” *Evening Post* (New York, N.Y.), January 15, 1862; “Fire in a Kerosene Factory,” *New York Daily Herald*, January 16, 1862; “The Recent Explosion in a Kerosene Oil Factory in Brooklyn,” *New York Tribune*, April 12, 1862; “The Late Disastrous Explosion in a Kerosene Oil Factory,” *New York Tribune*, April 15, 1862; “Visit of the Brooklyn Common Council Committee to the Kerosene Works,” *New York Tribune*, June 13, 1862.

¹⁸⁰ “Fire and Loss of Life,” *Boston Post*, September 9, 1861; “Fire—Narrow Escape of Two Men,” *Philadelphia Inquirer*, September 11, 1861; “Destructive Fire in Jersey City,” *Commercial Advertiser*, September 25, 1861; “Uninsurable Merchandise,” *Commercial Advertiser*, December 24, 1861; *New York Herald*, December 25, 1861, 4; “The Scene of Monday Night’s Fire,” *North American and United States Gazette*, May 14, 1862; “Disastrous Fire in Williamsburgh,” *New York Tribune*, May 30, 1862; “Extensive Fires,” *Boston Daily Advertiser*, October 23, 1862; “The Pirate Semmes Still on the Coast—Another Capture,” *Boston Post*, December 8, 1862; *Alexandria Gazette*, January 22, 1863, 2.

¹⁸¹ “Destruction of a Kerosene Refinery,” *Commercial Advertiser*, August 27, 1861.

“pour a little into an iron spoon, and heat it over a lamp until it is moderately warm to the touch. If the oil produces vapor which can be set on fire by means of a flame held a short distance above the surface of the liquid, it is bad.” Good kerosene, on the other hand, they wrote, “should be clear in color and free from all matters which can gum up the wick ... it should also be perfectly safe. It ought to be kept in a cool, dark place, and carefully excluded from the air.”¹⁸² Testing the oil, however, was only one of the practices advanced to defend against the dangers and difficulties of kerosene lamps. Keeping lamps clean from grease build up was equally important. Beecher and Stowe advised that “[t]he inside of lamps and oil-cans should be cleansed with” a mixture of one tablespoon of soda dissolved into every quart of water. “Take the lamp to pieces and clean it as often as necessary. Wipe the chimney at least once a day, and wash it whenever mere wiping fails to cleanse it. Some persons, owing to the dirty state of their chimneys, lose half the light which is produced. Keep dry fingers in trimming lamps. Renew the wicks before they get too short. They should never be allowed to burn shorter than an inch and a half.”¹⁸³

Living with kerosene lamps meant more light, but it also meant considerable, drearily monotonous work. With the increased risks of explosions and fires from the new lamps, properly “[c]leaning and lighting the lamps was skilled and painstaking work, labor that the mistress of a household usually reserved for herself even when help was available.”¹⁸⁴ When Lydia Maria Child compiled a summary of her activities for 1864, lamps featured prominently: “Cooked 360 dinners. Cooked 362 breakfasts. Swept and dusted sitting room & kitchen 350 times. Filled lamps

¹⁸² Catherine E. Beecher and Harriet Beecher Stowe, *The American Woman's Home* (New York: J. B. Ford and Company, 1869), 363-364.

¹⁸³ Catherine E. Beecher and Harriet Beecher Stowe, *The American Woman's Home* (New York: J. B. Ford and Company, 1869), 364.

¹⁸⁴ Jeanne Boydston, *Home and Work: Housework, Wages, and the Ideology of Labor in the Early Republic* (New York: Oxford University Press, 1990), 113.

362 times. Swept and dusted chamber & stairs 40 times.”¹⁸⁵ The work of feeding and caring for lamps was demanding, never-ending work, but lamp cleaning was about more than just getting the most amount of light into a room for each ounce of oil. It was an attempt to save lives. The women who had the time and resources to clean lamps (or have others do so for them), reshaped the micro ecologies of domestic spaces produced through the metabolisms and movements of people and flames. The sooty grime that kerosene flames deposited on lamp glass and layered across every nearby surface was also highly combustible, and increased the risk of fires and explosions.¹⁸⁶

The middle-class families who could make the time and space to properly test their kerosene and clean their lamps thereby gained an ecological advantage over working-class households. Most urban workingwomen lived in tenements that “were often cramped—filled, not only with people, but also perhaps with the tools and materials of outworkers.” Crowded into smaller, dirtier, leakier tenements, the “oily soot of cheap coal stoves and charcoal burners collected on floors and walls, their fumes lingering in the air,” while mixing with the combusted remains of wicks, kerosene, and candles, workingwomen still had to spend the extra time in scrounging, peddling, and outwork in order to make rent and meet the needs for bare life. Regularly cleaning lamps under such conditions was next to impossible, when “even the most basic of household labors—scrubbing a floor, arranging bedding, or preparing a meal—required a herculean effort.”¹⁸⁷ What the middle classes loathingly called “spring cleaning,” was in large part another strategy to negotiate living with open-flame lights, which along with the soot from the dark, enclosed wood- and coal-burning stoves, deposited layers of grime over every

¹⁸⁵ Diary of Lydia Maria Child, 1864, as quoted in Jeanne Boydston, *Home and Work: Housework, Wages, and the Ideology of Labor in the Early Republic* (New York: Oxford University Press, 1990), 85.

¹⁸⁶ Jane Brox, *Brilliant: The Evolution of Artificial Light* (Boston: Mariner Books, 2010), 86-87.

¹⁸⁷ Boydston, *Home and Work*, 91.

household surface, a process which accelerated during the winter months when shorter days and closed windows meant more combustion and even less circulation.¹⁸⁸

The spaces and times produced through camphene and kerosene lamps left a sea of human wreckage in their wakes. Lamp explosions killed and disfigured thousands of women who desperately sought to make ends meet around the dangerous lights, but even those who escaped the direct violence of a lamp explosion did not escape the temporal politics of sewing unscathed. The strain of sewing for hours after hours, day after day, year after year in tenements that were dark by day and dimly lit by carefully economized candles and lamps by night, reshaped the eyes, minds, and skeletons of tens of thousands of outworking women. So common and so severe was the work of sewing that the reformer and feminist Virginia Penny could spot a seamstress simply by her posture: “ ‘The habits the sempstress are indicated by the neck suddenly bending forward, and the arms being, even in walking, considerably bent forward, or folded more or less upward from the elbows.’ ”¹⁸⁹ Indeed, for nineteenth-century workingwomen, sewing constituted what amounted to, in the words of the historian Christine Stansell, a “biological experience of class.” On top of the fatalities from burns and explosions, one doctor in 1860 estimated that every year, a thousand women died from “causes related to sewing in the outside system. Malnutrition, fatigue, cold and bad ventilation in the tenements bred pneumonia and consumption, the major killers of nineteenth-century cities.” There seemed little that these women could do, as working more simply translated into more illness: “A newspaper investigator in 1853 heard that the

¹⁸⁸ Boydston, *Home and Work*, 86; Brox, *Brilliant*, 86.

¹⁸⁹ Virginia Penny, *The Employments of Women*, 310. See also Christine Stansell, *City of Women: Sex and Class in New York, 1789-1860* (Urbana: University of Illinois Press, 1986), 113-114.

hardest-working women could squeeze as much as double the average earnings out of piece rates, but the extra money usually went to medicines.”¹⁹⁰

Conclusion

But for the massive revolt of slaves, and the corresponding assertion of demands and power by white workers in the north (and include the seamstresses here), the landscape of labor, light, and industry may have looked very different after the Civil War or if it had not happened. Industrial slavery was coming into its own, and camphene, coal gas, and petroleum might easily have become a triumvirate of slavery, industry, and light. The intensity with which capitalists waged a war against the teamsters and oilworkers of the Oil Creek regions provides a glimpse into what the paths they may have pursued had slavery been available to them. Through their attempts to replace what they saw as greedy, unnecessary, and barbaric frontier camps with technology and order, oil barons quickly moved Oil Creek out of its frontier phase and into an industrialized, corporately controlled one. As we saw in the industrial slavery of Kanawha, following pioneer years, producers almost always sought to replace free laborers with enslaved ones. The same may very well have happened in western Virginia had a number of contingent events gone differently, had Virginia invested heavily in Kanawha oil and coal a few years earlier, or if western Virginia had managed to join the Confederacy.

It cannot be overemphasized that only rarely in the labor geography of producing and consuming lights in the mid-19th century were traditional “free wage workers” to be found. In American coal mines were either slaves or piece workers; in English and Scottish gas-coal mines were to be found women, children, and pseudo-slaves; in pig farms were farmers and pigs; in turpentine camps were slaves and rented slaves; around camphene and candles were found

¹⁹⁰ Stansell, *City of Women*, 114.

super-exploited out-working women in domestic workshops; in the whale fishery were lay-workers far, far from home; only in factories and gasworks were wage workers common. The Ohio Valley could have become a new center of industry combining the labor of free and enslaved workers into a new trans-Appalachian, Ohio-to-Mississippi industrial corridor.

The Confederacy, in spite of its agricultural pretensions, quickly realized that its true advantage was its ability to mobilize a massive army with no interruption to industry and agriculture. The accumulation of black slaves and poor whites began a fascist revolution during the war by divorcing the laboring classes of war and policing from the laboring classes of production, allowing for perpetual racial imperial war. The South, unique in the Americas in having massive, growing, self-reproducing, and roughly equal populations of slaves and whites, was long-primed for a fascist revolution. What held it back was the Union preventing the raising of permanent southern armies and waging of wars. Had the South industrialized more before the war, had it not had to play catch up to the same degree in assembling the capital, machinery, and industrial infrastructure to match the North, the fascism of the Confederacy would be much more obvious. Had the Confederacy won, even more so. The heroes of a victorious Confederacy would have been just as much the industrial iron and coal slaveholders as the planters. And the blockade and war made industrialization and import-substitution in the South even more necessary. All the preconditions for a fascist revolution (or, if “states’ rights” continued, multiple fascist revolutions) were in place.

The slaves’ general strike, then, that both kept the Union in the war and made it a war to emancipate the slaves, not only saved democracy, abolished slavery, and won the war, it forestalled a very real fascist revolution. Somehow, we’ve missed this. One way to more clearly see this hidden history, however, is to focus on the means of light. The industrial relations of free and enslaved workers in the Ohio Valley (and the Trans-Mississippi West) revolved surprisingly

tightly around accumulating and controlling the means of urban light. The analysis of the last few chapters, then, reveal a potential, narrowly unrealized fascist revolution that historians have been unwilling or unable to face. The post-bellum Confederacy would not have been the South of the 1840s, or even the 1850s, any more than was the case for the North. The victorious and heavily industrialized Confederacy, even more swaggeringly confident than it was in defeat, having demonstrated the powerful ability to wage industrialized warfare with black slaves and white soldiers would almost certainly have sought to violently extend this revolutionary war machine to the Caribbean, the American West, and possibly Mexico and South America as Southern boosters had long envisioned. This was a historical process put in motion and made partly possible by the history of light, and undone by the heroic revolution of hundreds of thousands of enslaved men and women who found or forced allies in the armies, governments, and industries of the North. John Rockefeller, kerosene, and free labor, monopoly capitalism were not the future. They were one future, written into being by the Civil War.

CHAPTER SIX

Staging Lights, Burying Labor: Dreams, Machines, Copper Mines, and the Spatial History of Electric Illumination

North America, 1882. Two men two thousand miles apart seeking two forms of capital for two different reasons. They did not know each other, and in all likelihood had never even seen or heard of one another; they were thoroughly divided by geography and history. And yet because of their parallel journeys, that distance was about to be bridged. One reached out from Butte, Montana to the wealthy mines of Utah and North Dakota, the other traveled from the theater district of Boston to the financial heart of New York. The former, a miner by the name of Marcus Daly was spurred by dreams of mineral wealth, the latter, a theater owner named T.N. Hastings was propelled by visions of profit and theatrical renown.¹ Daly hoped to convince wealthy mine owner George Hearst and his associates to invest in the recently struck, and more recently abandoned, Anaconda mine outside of Butte, for although its silver prospects seemed unremarkable, he believed a fortune in copper lay waiting to be mined. Hastings, who was the majority holder of the still-under-construction Boston Bijou Theatre, was going to New York to entice Thomas Edison and the president of the Edison Company for Isolated Lighting to help make the Bijou the first electrically lit theater in the United States. Daly and Hastings were each spinning distinct webs of work, matter, and energy; but threads of copper, electricity, and light

¹ Receipt, "Trip to New York (Electric Light)," November 28, 1882, Box 3, Folder 18, MS Thr 432, Boston Bijou Theatre Company Records, 1882-1927, Harvard Theatre Collection, Houghton Library, Harvard University. The receipt, and the others listing expenses for the three meetings with Edison concerning electric lights give no names, but they are written on stationary belonging to T.N. Hastings. I have assumed here that T. N. Hastings was in fact the one to travel and meet with Edison, although it is possible it was his brother E.H. Hastings or their partner George H. Tyler.

were slowly intertwining their worlds, connecting them through the fledgling promise of an incandescent America.

Taking these two moments together, the allies Hastings and Daly were hoping to win, and the technologies, capital, and labor they sought to mobilize were as seemingly unconnected as the men themselves. Daly and Hastings were, indeed, staging separate performances nearly a continent apart, but they were both engaged in a tangled process of production that scholars have termed “electrification.” The problem, though, the reason that men like Daly and Tyler have almost never been included in the same story, is that historians have been almost entirely unable to imagine many of the central protagonists in the history of electrification as historical actors at all. That is largely because these actors were neither human beings nor any kind of organic life form; rather, they were the electric machines, the artificial organisms, the technologies of light. Humans, rocks, animals, and machines came together in surprising ways to create electric light. This chapter tells the story of a handful of these interdependent actors, these electric lucifers. Before this story can properly be told, however, we must work backwards from the present. We need to start identifying what blinds us to this history before we can begin to see.

Hiding in Plain Sight

“I’m sorry, but unfortunately only archivists are allowed to handle the bulb,” apologized the librarian as she opened the small wooden box in front of me, revealing an iridescent copper-colored light bulb. “But yes,” she continued, “you may take pictures.” I thanked her for her help and reached forward to turn on the desk lamp, smiling at the irony of using a modern electric appliance to illuminate this historic incandescent light.

I knew from other documentation that this colored bulb was supposedly one of the original stage lights used in the opening of the Boston Bijou Theatre in 1882, the first theater in

the United States to be wired for electrical lighting. I had hoped that personally examining this Edison light bulb would help make the history of electric light more tangible, more real. But the bulb I had before me was now only an isolated curiosity, a mere fragment of a complex system of generators, wires, switchboards, and other lights. Now it was just this fossil, presented to me in a



Figure 6.1. Bijou Light

(Photo taken by author 12.03.09, Houghton Library, Harvard Theater Collection)

velvet-lined box as if it were a complete representation of early electric illumination. Yet I needed a lamp to see it. And then, not even how it might have appeared with a current passing through its bamboo filament. Was this just a dead light bulb?

There was a tension here, and it was more than the irony of lighting a light. For one, the Edison light before me offered little in the

way of reconstructing the electric illumination of the Bijou. Yet my inability to see this history of light had at least as much to do with the living, glowing lamp on the table as it did with the dead, dark bulb. When I had switched on the lamp to better see the bulb that could no longer illuminate itself, the real irony was that I did not question the lamp, that instead I tried to imagine what the defunct light would have looked like when part of its own electric circuit. I was thinking in terms of systems when I should have been thinking historically about work, energy, and power.

Look, but do not touch, the archivist had said. Indeed, this admonition was at the heart of the problem. Switch on a lamp—on, off, on. See, but do not work. Use, but do not make. We are everywhere surrounded by such arrangements, continually encouraged to imagine our built environments as static and natural systems. Natural not in the organic or unplanned sense of the

word, but as something that simply is, and without meaningful history. When we turn on the stove or the faucet, we expect the gas to light and the water to run. When we drive we expect paved roads and gas stations. Rarely do we give it a second thought unless something breaks or fails to appear.

The history of the electric light, then, is a history of human alienation: from nature, from the past, from labor, from other humans. Yet it is a dynamic history of connections, too. Although it might not have been readily apparent, when I expended the tiny amount of energy necessary to “turn on” the lamp in the archive by rolling the switch along my thumb, I momentarily connected myself to a vast web of labor and energy, thus allowing me to channel electricity into the bulb. Moreover, as I pulled my hand away and the light continued to shine, it was a further reminder that this energy web was built and maintained by others, powered by social and ecological actors separated from me in both space and time. If I was “shedding light” on anything I found in the archive, it was largely illumination expropriated from others. That I could not see them, let alone touch them, did not mean their labors were any less embedded in the physical infrastructure constituting the electrical grid.

In the 1880s, when electricity was first employed widely to produce artificial illumination, the electric light emerged as an ecologically, socially, and culturally contested technology. Exploring the ways that these contests played out, and they could have had very different outcomes indeed, is essential not only to enriching and reshaping our understanding of the past but to denaturalizing the present. Scholars have frequently treated machines and technologies as transhistorical objects that derive from thought (invention) rather than practice and contest (evolution).² Likewise, historians have wandered around the past too far and too long “shedding

² We will need to step outside of some historically reinforced conventions, especially the tendency to frame technologies in the extreme abstract—*the* candle, *the* light bulb, *the* kerosene lamp. If there were ever such things as

light” on this or that without ever considering how their subjects actually illuminated their worlds, let alone how historians have materially lit their sources. This chapter will challenge these trends and re-entangle a technology of light, that which first illuminated the Bijou Theatre, in the messy web of relations that made up its particular history.

In this chapter, it is my intention to explore the revolution in illuminating practices at the end of the nineteenth century, most commonly referred to as “electrification.” I have chosen to focus my attention on the worlds of work, power, and representation built around two entangled processes. The first was a relationship between an Edison isolated lighting plant and the Boston Bijou Theatre that it illuminated. This story begins in 1882, when the isolated plant and theater were both built and opened, and concludes in 1886 when this relationship was sundered as the Bijou became integrated into a central station lighting network. The second process was that by which the town of Butte, Montana became the world’s largest copper camp. This story, too, begins in 1882, when copper mining truly began, and concludes around 1900 when the Standard Oil Company took over around two-thirds of Butte’s mines, forming the Amalgamated Copper Mining Company.

Let us begin with this bulb’s first performance.

Performing Incandescence

It was a damp and cloudy evening, and a crowd had gathered outside a theater in the cold winter air of a December night in Boston. Minutes, then half an hour passed and still the

these transhistorical technologies, they were as cultural constructions, commodity narratives linked to myths of scientific progress. Historically and materially speaking, there were millions of candles, bulbs, and lamps, each entangled in a particular web of relations embedded in a given time and space. *The Edison light*, however, like *the steam engine*, was a powerful cultural narrative with real material implications. How a diverse group of historical technologies was abstracted into a transhistorical singular is something that my dissertation will attempt to explain. For some successful examples of histories that materially embed technologies see: Richard White, *The Organic Machine* (New York: Hill and Wang, 1995); Stephen Pyne, *Vestal Fire: An Environmental History, Told through Fire, of Europe and Europe’s Encounter with the World* (Seattle: University of Washington Press, 1997); Carolyn Thomas de la Peña, *The Body Electric: How Strange Machines Built the Modern American* (New York: New York University Press, 2003).

growing crowd was kept outdoors. “The police had much difficulty, so great was the crowd, in keeping a way open for the passage of horse-cars and other vehicles” reported a local paper, that when “the doors were finally opened there was a great rush. A pile of unclaimed overshoes gathered up from the sidewalk and stairs after the crowd had surged in, was a significant sign of how great this rush was.”³

They were there for a host of reasons, but most had surely come to witness an unusual confluence of “firsts.” At quarter past, the doors to the Boston Bijou Theatre were thrown open for the first time, and those in the crowd fortunate enough to purchase tickets became the first audience to grace its auditorium. It was, excitingly, to be the first time that Gilbert and Sullivan’s *Iolanthe* was performed in Boston. Yet as the audience filed into their seats, what would have appeared truly remarkable, what no one had ever before seen in the United States, a true first, was a theater illuminated entirely by electrical lighting.

“The Bijou Theatre was opened last evening amid a blaze of glory,” reported the *Boston Evening Transcript*, despite finding that “the trouble with Mr. Sullivan is that he does not sparkle at all—at least not in this, his last work.” The glory was in the new architecture, the scenery, and in “the many-colored lanterns pendent from the ceiling, and the host of little pear-shaped pendants, each one of which encloses an electric spark, all contribute to form a picture wholly unique in its way.” If the operetta was underwhelming, there was no doubt about the success of the electric lamps, for “we should say that the lighting and ventilation of the new house were the most perfect we have yet seen. The Edison incandescent lights worked to universal admiration, and it was shown on more than one occasion how beautifully manageable and tractable this mode of

³ “The ‘Bijou,’” *Boston Daily Advertiser*, December 12, 1882.

lighting can be made.”⁴ Ventilation was no minor comfort at the time, and it was closely related to lighting. All down and around Washington Street, the core of Boston’s theater district, were stages and auditoriums illuminated by the yellowy flames of gas lamps. Not only did they flicker or, as footlights, produce hellish patterns of light and shadow on stage, they raised temperatures to upwards of 100 °F, consumed oxygen, and frequently left patrons with intense headaches.⁵ Electric lights, then, were interpreted and imagined as much for what they did as for what they did not do. They were glowing in a thick web of culture and history and these lights were no passive objects. They were performers every bit as active as the organic singers and dancers on stage.

Moreover, Gilbert and Sullivan musicals bound both organic and inorganic actors together in quite historically specific ways. A little over a year before the Bijou opened, the Savoy Theatre in London became the first theater in the world wired for electricity. The Savoy was built specifically to show Gilbert and Sullivan operas (hence the term Savoyard) and *Patience* was the first electrically illuminated production in history. It used Swan incandescent lights, however, a fact Edison could not have failed to notice. A year later, on November 25, 1882, as *Iolanthe* debuted in both the Savoy and the Standard Theatre of New York (not electrically illuminated), the final arrangement between Edison and the Bijou was being worked out in New York. In fact, receipts show that on their final trip to New York for “Electric Lights Business,” the Bijou owners saw a performance of *Iolanthe*, possibly with Edison. In a very real sense, then, Gilbert and Sullivan and electric lighting colonized Boston’s Bijou as a pair—they helped carry one another. The same technologies and playwrights, however, did not mean the entire ensemble would

⁴ “The Opening of the Bijou Theatre,” *Boston Evening Transcript*, Tuesday, December 12, 1882.

⁵ Wolfgang Schivelbusch, *Disenchanted Night: The Industrialization of Light in the Nineteenth Century*, trans. Angela Davies (Berkeley: University of California Press, 1995), 50-51.

remain the same. Swan electric rode that union to success in London while Edison reproduced the arrangement in his favor in Boston—different opera companies, different stage managers, different theater owners, but each gathered around and structurally empowered through their relations with shared scripts and electrical lights.⁶ And while they illuminated and revealed connections, these social lights also blinded and obscured, shaping how Americans were reimagining their worlds.

It is my contention that visibility, as a purely positive and creative formulation, is woefully inadequate for theorizing lighting in the gilded and progressive ages. While it is certainly true that electrical lighting systems were involved in producing visible spaces, bodies, and practices, they were also actively constructing *invisibilities*. In the Bijou, Edison's incandescent lighting system helped to further distance and hide the gritty and mundane backstage and stage crew from the audience by operating "automatically." Front stage, now better illuminated than was ever possible through any combustion-based illuminants, became an increasingly magical space, at once more divorced from the reality of the audience and more believable (whether for the fairies and nymphs of *Iolanthe* or the settings of more mundane operas like the second shown at the Bijou: *Pounce & Co., or Capital vs. Labor*). Theatrical "productions" were becoming increasingly beautiful slights of hand.

As spectators gawked at these apparently automatic lights, so famously associated with Thomas Edison, the "wizard of Menlo Park," they sustained and reproduced his legend while they were blinded to the labor and history behind the incandescence. Electric wizards were continuing and intensifying a process begun with camphene, constituting a progressive distancing from laborers who, for political reasons, were denied credit and excluded from narratives of

⁶ "The Electric Lights on the Savoy Stage," *Daily News* (London, England), Thursday, December 29, 1881.

progress. As explored throughout this dissertation, this was a narrative process that began by explaining progress through the celebrated exploits of idealized whalers and heroic inventors. Yet it was a narrative foundation that steadily crumbled under the combined ideological weight of white patriarchy and the political economy of industrialization, which together served to relocate the work of producing and consuming lights to slaves, women, hogs, and frontier mining camps and oil towns populated by rowdy, rootless, decidedly un-bourgeois workers, prostitutes, conmen, and immigrants. Of the original narrative cast, only inventors remained as respectable figures. By the time Edison came along, most middle- and upper-class Americans fervently and anxiously wished to deny any connection between the working masses and any notions of technological progress. The snobbery of the upper class, and the deeply political class-refracted antipathy of industrialists like Rockefeller towards labor had spread through the ideologies of white supremacy and Anglo-Saxonism to the middle and professional classes, including many journalists. Edison's particular genius and luck was to weave technics and popular discourse into a series of powerful cultural performances giving form to and further reinforcing such anti-labor notions of progress, disguised through the magic of electric lighting and the myth of the inventor.

Invisible were those who had installed the system, the Menlo Park factory hands churning out light bulbs and dynamos, the Connecticut copper wire mills, the migrant Irishmen laboring in the copper mines of Michigan and Montana, the globally proliferating subterranean worlds of coal and iron mining. So too were the employees of J.J. McNutt Builder and Manufactures who razed the old Gaiety Theatre, leaving only the walls, and built the fireproofed Bijou in its place (further evidence that the contest between gas and electricity was not just about light).⁷ No mention was made of either Patrick or Jerry O'Connor who for at least a year guarded the Bijou

⁷ Receipts for building expenses, 1882-1883, Box 4, Folder 28, and Box 5, Folder 29, Boston Bijou Theatre Company Records.

every day, Patrick as night watchman and Jerry as day doorkeeper. Nor did the weekly labor of Joe McElroy, the gas man/electrician receive public notice. And these were only a few of the more permanent members of the backstage crew.⁸ As for the sets of the lights themselves, it was widely noted in the papers that the largest chandelier (or electrolier as it was sometimes called) hanging above the audience had been made for the Khedive of Egypt. What was not explained was how it ended up in a Boston theater and came to be refitted for electric lamps, a relocation and transformation I can only presume had something to do with the British invasion of Egypt that year.⁹

While these lights performed, the work behind them was disappeared, just as the labors of the builders, stage crew, scenic artists, and watchmen were buried under the willing suspension of disbelief directed at the performance onstage. In fact, as the *Boston Daily Advertiser* reported, even Thomas Edison himself, who had attended the opening night to promote and assure the successful debut of his lighting system, was hidden from view in a building located 500 feet from the theater, where he “personally superintended the electrical apparatus last evening, remaining in the engine-room during the entire performance, and not looking once into the theatre.”¹⁰ Most importantly, industrial wizards like Edison kept dazzled audiences from seeing their material relationships with these industrial geographies. For every theater, department store, or city boulevard that these technologies illuminated, they hid and obscured a vastly more expansive geography of transnational actors and ecologies.

⁸ Salaries, Box 3, Folders 18 and 19, Boston Bijou Theatre Company Records.

⁹ A letter dated November 13, 1882 from “Verity & Company, Ventilating, Lighting and Sanitary” of New York to Hastings and Tyler stated that they would sell them three chandeliers, one of which had been built for the “Kedive” of Egypt and was “now hanging in the entrance of the Hoffman House,” the hotel where Hastings and Tyler stayed during their trips to New York. The Khedive chandelier was sold for \$1000. Box 4, Folder 28, Boston Bijou Theatre Company Records.

¹⁰ “The ‘Bijou’ Features of the Opening Night of the New Theatre,” *Boston Daily Advertiser*, December 12, 1882.

Embedding Labor

It was, and remains, a convincing performance. The audience could try to unravel the illusion by following the energy flows, from glowing bamboo filament through the walls back to the engine room. But by relying only on observation, they would be swept right back into the theater lights, an endless circuit. As historians we have certain advantages over the contemporary observer. We can glide through reconstructions of the past in four dimensions.

Instead of following the electric energy forward through time, let us turn around and inwards, tracing it backwards through the copper wires. We still end up in the engine room, but then close your eyes, take a step, then a leap and bound back in time and you are somewhere else entirely. It is dark, damp, and unbelievably hot. The air is heavy and the only light seems to be a flame floating and flickering in the darkness. It is a candle mounted on a hat, and the words “E.

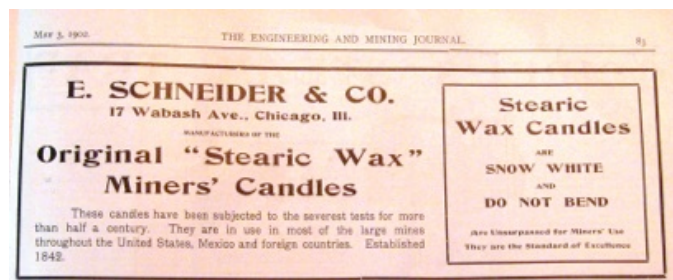


Figure 6.2. Schneider Candle Ad

(Advertisement, *Engineering and Mining Journal*, May 3, 1902, 83.)

Schneider & Co.” can be seen pressed into its base. It was several months before the Bijou would open, and the scene was in a Michigan copper mine. The journey travelled by that candle bore little

resemblance to that of the head upon which it rested, but the two had nonetheless converged deep under Michigan ground. In the Schneider candle factory, fat accumulated by western cattle driven north to Chicago had been combined there in death with corn-belt hogs and Mississippi cotton to become a heat-resistant miner’s candle. Patrick O’Dwyer, an Irish miner in West Cork active in the Land League resistance, following family and (perhaps false) promises had sailed to America, contracted to mine the copper deposits of the Calumet peninsula in Michigan.¹¹ There,

¹¹ David M. Emmons, *The Butte Irish: Class and Ethnicity in an American Mining Town, 1875-1925* (Urbana: University of Illinois Press, 1989), 54.

an Irish-born miner and a candle channeling the energy of the meat industry intersected to transform a dark shaft into a working copper mine.

Like the teams of men working each of the rock faces, or “stopes,” around him, O’Dwyer worked with a partner, drilling six- to eight-foot deep holes, one to two inches wide, into the granite rock face. Lit only by the flame of a candle held by a spiked candlestick driven into a timber support, one man would swing a sledgehammer while the other held a long steel drill with his bare hands, trusting his partner, and skillfully twisting and rocking the drill with every blow. James Patten remembered working for his father’s mining crew, watching the men swing eight-pound hammers at the tiny target of those drills, only seven-eighths of an inch in diameter, and how it “took a lot of skin off” his father’s hands learning to work the hammer and drill.¹² When done alone like this, hammer in one hand, drill in the other, it was called single-jacking, but most copper mining was done by two men, with longer, thicker drills and heavier sledge hammers in a process called double-jacking. After having drilled a cluster of between six and twelve holes into the face, the men would pack it them full of dynamite, carefully cut and lay the fuses, retreat to a safe distance and ignite the charges.¹³ The fuses were arranged such that they would not all detonate at once, giving the miners the chance to listen carefully to make sure they had all exploded. Dealing with undetonated sticks of dynamite was some of mining’s most terrifying work, even when miners knew it was there.¹⁴ These were the John Henry’s of copper, only they were racing each other as much as any machines.¹⁵ Starting at seven or eight o’clock in the

¹² James Patten and Phyllis McLeod Patten, interview by Laurie Mercier, February 9, 1983, OH 460, Montana Historical Society Archives, Helena, MT [hereafter MHSA].

¹³ Brian Lee Shovers, “Miners, Managers, and Machines: Industrial Accidents and Occupational Disease in the Butte Underground, 1880-1920” (master’s thesis, Montana State University, Bozeman, 1987), 22-23.

¹⁴ Tour Guide, Underground Mine Tour, the World Museum of Mining, Butte, MT, May 18, 2012.

morning, this could take the men all day, with a half-hour for lunch, and blasting was done in the afternoon right before they left their shift.

Following the explosion, men called muckers, the workers lowest in the copper mining labor hierarchy, shoveled the shattered ore into carts, which were hauled by mules and men to the shaft station. Herb Mickelson remembered how smart underground mules were, which “could tell how many cars you hooked them up to,” and would refuse to be overworked, but noted that “many mules became blind after years underground.”¹⁶ Day after day, O’Dwyer and his crew drilled, blasted, mucked, and carted ore over rail through the mine shaft, past the pumps and fans and into the sunlight streaming down from Michigan skies. Back into the ground Patrick and his fellow miners went, dangerously and laboriously digging deeper, building mountains of displaced earth in the hopes of wages at the end of the month. It was a hope that he would never realize. Patrick O’Dwyer would die in that mine, like so many, killed by an “accident.”¹⁷

Around the mouths of these subterranean realms, towns had sprung up sustained by the cyclical movements of people, rock, and money. As O’Dwyer retreated underground to his approaching death, other men transported the rock to a smoke-belching smelter.¹⁸ From the smelter, the refined copper was carried to a train, then a steamship bound for Wales. There, the smelted copper was further refined, made pure, put on another steamship and reached Connecticut. Men with specialized machines rolled and transformed this pure copper into wires

¹⁵ For an excellent social and cultural history of drilling and blasting, see Scott Nelson’s study of John Henry and the industrial work songs of the nineteenth-century United States. Scott Reynolds Nelson, *Steel Drivin’ Man: John Henry, the Untold Story of an American Legend* (New York: Oxford University Press, 2006).

¹⁶ Herbert H. Mickelson, interview by Laurie Mercier, January 12, 1982, OH 225, MHSA.

¹⁷ Emmons, *The Butte Irish*, 54.

¹⁸ For an excellent new history of copper smelting and the environmental history of open-pit copper mining (which follows the period of mining explored here), see Timothy J. LeCain, *Mass Destruction: The Men and Giant Mines that Wired America and Scarred the Planet* (New Brunswick: Rutgers University Press, 2009). LeCain’s analysis of the relationships between capitalism, technology, and the kinds of ecological practices that he calls “mass destruction” have greatly informed my own thinking, and have helped provide a language and framework for thinking through violence, energy, and work across multiple scales.

that were purchased with Edison capital, transported to Boston, laid under streets and through walls by Irish laborers. Light bulbs were installed, coal fed into the steam engine, and before the audience entered, a switch was thrown and the lamps started to shine. We are back where we started, but history carried on us a very different journey, and it was only one possible path.

Indeed, had we truly traveled back in time we would have been in several places at once, and the further back we traveled the more fragmented we would have become, the more we would be stretched. The coal traveled a different path than the copper, than the bamboo or the glass bulb, than the workers and machinists. Each path converged at the Bijou that night, but none were inevitable.

Environmental historians have gone to considerable lengths to demonstrate how interconnected and inseparable humans and nature are by tracing just such webs of matter and energy, emphasizing how “seamlessly” culture and nature blend into one another.¹⁹ But, as Marx pointed out over a century ago, that is not necessarily saying much, for “Man lives from nature, i.e., nature is his body, and he must maintain a continuing dialogue with it if he is not to die. To say that man’s physical and mental life is linked to nature simply means that nature is linked to itself, for man is a part of nature.”²⁰ In other words, “humans were connected to nature” is not really an argument, it is where we should begin our analysis. Moreover, the world, with all its various and contested metabolisms is riddled with seams, unevenness, difference, and shifting boundaries; just because we can show that everything is “natural” or material does not mean everything is the same as everything else. Relations and connections can produce difference and

¹⁹ For a highly successful example of such an emphasis on “seamlessness,” see Brett Walker, *Toxic Archipelago: A History of Industrial Disease in Japan* (Seattle: University of Washington Press, 2010). For a recent critique of such holism in environmental historiography, see Gunther Peck, “The Nature of Labor: Fault Lines and Common Ground in Environmental and Labor History,” *Environmental History* 11 (April 2006): 212-38.

²⁰ Karl Marx, *Early Writings* (London: Penguin, 1992), 328.

destruction as easily as harmony and systems. Copper miners were alienated from the products of their labor by their wage relations to capital, a social arrangement of power maintained by the intertwined flows of human labor and copper kept circulating (or not) by the circumscribed choices made every day by actors all along the pathways outlined above. That geography of labor and energy had to be made and built, contested and dragged into existence.

Butte: Comstock Colony, Foundation of Electricity

The city was indeed a collection of hard-working people, but to many observers there seemed to be something unnatural, perhaps sinister, about the place. Men—and Butte was a very manly place—derived their primary livelihoods, not from upon, but from beneath the earth’s surface. Men employed fiery, subterranean methods to change rock into metal. Out of men’s work-places spewed water colored yellow and gray, spewed molten slag that solidified lava-like on the landscape, spewed sulfurous smoke that would choke man or beast.²¹

In tracing the direct material history of the Bijou copper, we ended up in Michigan. But copper was never just material. It was an idea, a promise, and in the late nineteenth century, it was a commodity. Just as Edison was attempting to do much more than illuminate the Bijou theater—was trying to conjure and structure an electric future that he could excavate and exploit in his present—others, like Marcus Daly, sought to secure passage and profit in that future by building new copper empires. And nowhere was this happening more spectacularly than below and above Butte, Montana. Daly first started mining copper in Butte in 1883, and by 1887, Butte had become the world’s largest producer of copper, rapidly surpassing the older mines of Michigan, Chile, and Cornwall. In 1887, Butte produced 79 million pounds of copper, passing Michigan.²²

²¹ Frederic L. Quivik, “Smoke and Tailings: An Environmental History of Copper Smelting Technologies in Montana, 1880-1930” (PhD diss., University of Pennsylvania, 1998), 64.

²² Quivik, “Smoke and Tailings,” 170.

Where Michigan had been founded around rich, sometimes nearly pure copper ores mined for use in brass and bronze manufacturing, Marcus Daly and his Comstock backers envisioned massive mining and smelting operations at Butte. There, they hoped to use economies of scale to transform Butte's relatively poorer, but vastly more extensive veins into the mountains of pure copper demanded by electric lighting and telephone systems-builders.²³ By 1886, the Anaconda concentrator was processing 1,200 tons of ore per day, but even this was not enough to keep up with ore produced from the mines, and by 1889, with the addition of a new steam stamp works, raised production to 3,000 tons per day.²⁴ 7,100 men were employed in mining and smelting in Butte in 1890.²⁵ It was an industrial ascent felt and seen for miles. Sulfurous smoke and arsenic tailings discharged by smelters into air and water devastated surrounding vegetation, poisoned livestock and people for miles, and accumulated in the environment.²⁶ By the early twentieth century, literally not a single tree nor blade of grass grew, or could grow, on what many called "the richest hill on earth."²⁷

Before Butte was the world's most important industrial mining camp, it was a peripheral mineral haven at the margins of a western wage economy. In the decades during and after the Civil War, white settlers moved into the territory to find their fortunes panning for gold. They moved between two massive forces, the United State military at their head and a capitalist industrial mining complex at their back. The United States military, together with a capitalist complex of cattle-ranching and railroad building, had recently completed its violent conquest of American Indians in the plains and mountain west through sustained campaigns of ethnic

²³ Quivik, "Smoke and Tailings," 86-87, 125-127.

²⁴ Quivik, "Smoke and Tailings," 198-200.

²⁵ Quivik, "Smoke and Tailings," 212.

²⁶ Quivik, "Smoke and Tailings."

²⁷ Michael Punke, *Fire and Brimstone: The North Butte Mining Disaster of 1917* (New York: Hyperion, 2006), 87.

cleansing and the deliberately planned devastation of the bison herds from which the powerful horse-based Comanche, Cheyenne, Kiowa, Lakota, and Sioux polities drew the means of life, political power, and culture.²⁸ This conquest made Montana safer for white settlers. Meanwhile, a massive industrial mining complex had emerged in California, Colorado, and Nevada, first displacing California gold rushers and then rooting itself in Nevada through thousands of miles of shafts and tunnels driven down into the Comstock gold and silver lodes. Like many future industrial mining camps in the West, Butte began as a place established by white placer miners seeking to avoid being trapped in a wage system. Like the early forty-niners, these gold seekers hoped to pan or dig for gold on claims they owned before the arrival of a fully fledged capitalist mining system displaced them (or bought them out) and restructured all mining work through wage and contract relations.²⁹ Gold never really panned out in Butte, however, and with the growth of rail and the expanding prospecting of capitalists and engineers grown rich on Comstock silver, in the 1870s, Butte was reconstituted as a growing silver-mining camp. In short, even before copper was discovered, Butte had already become a fully capitalist space, with powerful corporations, large and assertive unions (Butte was known as “the Gibraltar of unionism”), and speculative capital.³⁰

One cannot truly make sense of the politics of labor in the West, however, without attending to the politics of movement. In recent work, the historian Gunther Peck has convincingly demonstrated how struggles to define and control transnational workers’ mobility

²⁸ Richard White, *“It’s Your Misfortune and None of My Own”: A New History of the American West* (Norman: University of Oklahoma Press, 1991), 85-118, 212-235.

²⁹ White, *“It’s Your Misfortune and None of My Own”*, 183-211, 236-297.

³⁰ For in-depth studies of labor, capitalism, and politics in Butte, see Jerry W. Calvert, *The Gibraltar: Socialism and Labor in Butte, Montana, 1895-1920* (Helena: Montana Historical Society Press, 1988); Emmons, *The Butte Irish*; Laurie Mercier, *Anaconda: Labor, Community, and Culture in Montana’s Smelter City* (Urbana: University of Illinois Press, 2001).

determined and reinvented free labor ideology and practice across the North American West.³¹ With its large Irish-born workforce, Butte reflected this trend, but was also different in several important ways. The Irish, for all the difficulties and discrimination they experienced earlier in the century, especially in the east, had, by the late nineteenth century, fought hard to claim the mantle and privileges of whiteness and of English-speaking workers in a geography of labor where the unskilled were increasingly defined as immigrants from non-English-speaking agricultural regions like southern and eastern Europe, Mexico, and China.³² But most importantly, I would contend we cannot understand the spatial politics of labor in Butte without understanding how the horizontal politics so brilliantly explored by Peck were mutually constituted (and reconstituted) in the vertical spatial politics of underground copper mining. I am, here, taking a similar approach to that of Thomas Andrews, with the added consideration of how the three-dimensional spatial politics of Butte's copper worlds were constituted with and against the copper worlds being assembled into incandescent stages of modernity and spectacular, magical, labor-free capitalism.³³ The slow violence of frontier, underground hard-rock mining and the artfully hidden work of electric lighting made the costs and stakes of struggle difficult for both contemporaries and historians to see or articulate.³⁴ However, if we are to have any chance

³¹ Gunther Peck, *Reinventing Free Labor: Padrones and Immigrant Workers in the North American West, 1880-1930* (New York: Cambridge University Press, 2000).

³² Emmons, *The Butte Irish*; Peck, *Reinventing Free Labor*.

³³ Thomas Andrews argues that mobility alone is not enough to understand the labor struggles of western miners. He suggests that historians must also pay closer attention to the spaces of work, what he calls the "workscape," above and below ground. Thomas G. Andrews, *Killing for Coal: America's Deadliest Labor War* (Cambridge: Harvard University Press, 2008).

³⁴ For the concept and theory behind the term "slow violence," see Rob Nixon, *Slow Violence and the Environmentalism of the Poor* (Cambridge: Harvard University Press, 2011). Nixon uses the framework of slow violence to bring greater conceptual and moral clarity to drawn-out, often invisible ecological and biological processes like global warming, pollution, environmental change, disease, and famine. The concept of slow violence, Nixon contends, can help provide narrative structures to re-politicize processes that capitalist and international systems have persistently and even unconsciously sought to externalize, to render "natural" problems, or at the very least, human problems with no clear entity to blame. For previous analysis along these lines, see James C. Scott, *Seeing Like a State: How Certain*

at making sense of the social history of lighting, the hidden cleavages, destructive dialectics, and subterranean and embodied sites of incandescent violence need to be revealed.

As Marcus Daly, flush with investor capital, began planning to realize his copper dreams, the first thing he would have done was order in the machines. These were massive technologies. The engines, elevators, roasters, smelters, millers, and the engineers who tended them, were what made mountains into industrial mines. These highly capitalized, highly powered assemblages of steel and steam and engineering knowledge were also usually the first migrants and primary agents of hard rock worlds, preceding most of the industrial workers who would drill, blast, shovel, and cart ore out of the ground. Manufactured in eastern and European industrial cores, these “mammoth pieces of mining and milling equipment, moved in steamboats and wagons, were among the mechanical wonders of an age that prided itself on technological innovation.” Making their way by ocean, river, and rail, these enormous machines were often dragged the final leg of the journey in dozens of ox-drawn wagons.³⁵ Butte was in many ways a colony of Comstock. Constructed in the late 1860s, it was in the hard rock mines of Nevada’s Comstock Lode where workers, capitalists, engineers, and nature invented and accumulated the social relations, industrial knowledge, machines, capital, and labor systems that would form the basis for modern industrial underground mining. By 1880, there were thirty seven mines in Nevada with workings reaching below 1000 feet and five extending over 3000 feet underground, using, all told ninety steam engines. Meanwhile, not a single U.S. mine outside of the west reached

Schemes to Improve the Human Condition Have Failed (New Haven: Yale University Press, 1998); Mike Davis, *Late Victorian Holocausts: El Niño Famines and the Making of the Third World* (New York: Verso, 2001); Timothy Mitchell, *Rule of Experts: Egypt, Techno-Politics, Modernity* (Berkeley: University of California Press, 2002); Anna Lowenhaupt Tsing, *Friction: An Ethnography of Global Connection* (Princeton: Princeton University Press, 2005); Linda Nash, *Inescapable Ecologies: A History of Environment, Disease, and Knowledge* (Berkeley: University of California Press, 2006); LeCain, *Mass Destruction*; Brett L. Walker, *Toxic Archipelago: A History of Industrial Disease in Japan* (Seattle: University of Washington Press, 2010); Nancy Langston, *Toxic Bodies: Hormone Disruptors and the Legacy of DES* (New Haven: Yale University Press, 2010).

³⁵ Mark Wyman, *Hard Rock Epic: Western Miners and the Industrial Revolution, 1860-1910* (Berkeley: University of California Press, 1979), 3-5.

below 1000 feet.³⁶ Marcus Daly had gotten his start in the Comstock Lode and it was there that he had forged his relationship with his major future investor, George Hearst, who had himself amassed one of the largest fortunes in the world from those mines and who would later help reproduce the hard rock regime forged in Comstock by backing men like Daly.³⁷

Sinking shafts was hard, and capital intensive work, but it was necessary to reach the veins which usually *began* several hundred feet underground. Moreover, most mine operators tried their best to work their way up a vein from as far below as they could manage, allowing gravity to do much of the work of pulling the ore into the horizontal tunnels, or “drifts.” This meant that shafts would have to be sunk deep before mining could really begin.³⁸ Shafts and drifts had to be drilled and blasted and timbered through unstable ground. Butte’s geology was the product of numerous faults, and the mines themselves shifted and undulated unpredictably as rock and faults slid, buckled, and cracked from the combined strain of geological forces and the work of drilling, blasting, timbering, and human-introduced circulation of air and water underground.³⁹ An inquest into a miner’s death in 1890 provides a window into the work and dangers attending even newly begun shafts. Sunk only fifteen or twenty feet, the shaft was not even timbered yet, but as the shift began at 7 AM, two men “sounded the side of the shaft this morning before they went down before they started to work and they thought everything safe,” testified one miner. “Both were in the bottom of the shaft and had been working ten or fifteen minutes when about three ton of earth fell on the” two men, “burying both.”⁴⁰

³⁶ Wyman, *Hard Rock Epic*, 6.

³⁷ Punke, *Fire and Brimstone*, 22.

³⁸ Quivik, “Smoke and Tailings,” 39-40.

³⁹ Shovers, “Miners, Managers, and Machines,” 41-43.

⁴⁰ Re – inquest of John Ritt, deceased, September 13, 1890, Misc. 574, Office of the Clerk of the Court, Butte-Silver Bow Courthouse, Butte, MT [hereafter OCC-BSBC].

To prevent or at least limit and channel such violence, Butte mine superintendents, like those of the Comstock Lode, ordered extraordinary quantities of timber to be installed underground. Indeed, so prodigious was hard rock mining's appetite for timber that one author described the Comstock Lode as the "tomb of the forests of the Sierras."⁴¹ The geography of lumber pulled into existence to service such lode mining rapidly transformed the countryside, stripping it of trees, and "gigantic drives of lumber and cordwood up to four miles or more long took place on the Carson River each spring," shipping hundreds of thousands of feet of lumber down flumes each day. By the 1890s, an estimated 800 million feet of timber had been buried to support the structural integrity of the hundreds of miles of underground drifts, crosscuts, and chambers.⁴² Most of the timber used in Butte was red fir, but by the early twentieth century, with mines consuming over 40 million cubic feet of timber underground each year, one report from the U.S. Bureau of Mines, alarmed at the "rapid depletion of our forests," noted that in "proximity to the important mining centers of Butte, Montana, and of Coeur d'Alene, Idaho, the accessible supply of red fir is largely exhausted," and less durable woods were being used instead. Even before such weaker woods had begun finding their way underground, however, the report claimed that from decay caused by moisture, heat, strain, and insects, "[e]xperience has shown that the average life of mine timber in permanent openings, where it is not subject to crushing, is about 3 years, but often under conditions unusually favorable to decay the life will not exceed one year."⁴³ In 1898, Marcus Daly's Butte mining kingdom, known as the Anaconda Mine

⁴¹ Quoted in White, *"It's Your Misfortune and None of My Own"*, 234.

⁴² Randall Rohe, "Man and the Land: Mining's Impact in the Far West," *Arizona and the West* 28:4 (Winter 1986): 307.

⁴³ R. R. Hornor, "Growing Need in Mining for Preservation of Mine Timber," *Arizona Mining Journal* 5:18 (February 15, 1922): 7.

Company, spent \$428,473.65 on timber, three times what it spent on dynamite, and ten times what it spent on candles.⁴⁴

With such enormous and continuous timber requirements, superintendents assigned teams of men to focus exclusively on preparing and carrying timbers throughout the mines. At the Pennsylvania Mine, timbermen began the day at seven or eight in the morning, “taking timbers from the carpenter shop through this tunnel and lowering it down to the one hundred” level through 16 to 18 inch wide “timber slides” running alongside the ladders of the “manways” (or small vertical and steeply sloped shafts connecting drifts away from the main elevator shaft). The tunnel was at least fifty feet long, and according to one miner’s testimony, the timbermen would “load up a truck where the carpenter shop is and run it in and then transfer it on to a little truck and run it into this tunnel,” then lower the timbers down the timber slide, “and then lowering it down from the one hundred to the back of the two hundred, and also running timber in for the two that was working on the ore.”⁴⁵

Supplied by the timbermen, it was often the miners’ job to actually install the timbers, work that could mean the difference between life and death. Knowing how, where, and when to do this was critical, but even the most experienced miners could only hope to thread the “dead work” of timbering through the paid work of accumulating ore for so long before something gave out. In 1887, the miner John Sullivan testified before an inquest that he had “known Jerry Toomey for about two years at Parrot Mine. Was with him when he was caved on about 15 min of 2 o’clock.” They were working a stope (or workface) 42 feet above the 300 level, and 500 feet in from the shaft and “had to drill two holes to get ready for a set of timbers and when our

⁴⁴ General Journal A Dec. 1896-June 1899, pg. 81, MF 426, Anaconda Copper Mining Company records, 1895-1964, MHSA.

⁴⁵ Inquest on death of Harry W. Smith, July 5, 1902, Box 163, Folder 4, MC 169, Anaconda Copper Mining Company Records [hereafter ACMCR], MHSA.

blasting was clearing up the cave came from hanging wall. Don't know how much fell on him. It was waste and not ore," he noted, implying that therefore no one would bother measuring it.⁴⁶

This was not some unforeseeable or inevitable accident. The risk and terror of cave ins and falling rock suffused every corner and minute of the Butte underground, but some places and times were known to be more deadly than others. "It was a treacherous wall," Sullivan explained, "and we were warned to keep timbered up, about half hour before Mr. Tibby [the shift boss] came along and told us to put in timbers as soon as we could." For his part, Tibby testified, "Don't think there is a man in the mine but is warned when he is in a dangerous place. Told this man this morning to be careful and yesterday cussed him for being so careless. They had gone a little beyond their work and were ahead of timber about 10 ft. Count that the worst place in mine and take every precaution. Had the stull [timber prop] in but was too short and they take they chances rather than go to the trouble of putting in sufficient stulls. It looked to be all right when I was there this morning."⁴⁷ This was, moreover, Sullivan's and Toomey's wall only half the day. All work in the mine was divided into two ten-hour shifts, so that the work, knowledge, and risk of certain sections of the mine were shared and exchanged awkwardly across sometimes muddled transitions. Michael Murphy testified at the inquest that he worked "on opposite shift from Mr. Toomey. Did not think it was safe this morning when went off shift, worked along foot wall to get ready to timber. Worked there last night and sounded it a couple of times," meaning he rapped or hammered the wall and listened carefully for signs of weakness, "and thought it was all right and have seen places that looked worse that did not fall but knew it would do to watch. When I thought there was danger always put in timber. Had plenty of time. If I had been there would

⁴⁶ Re – inquest of Jerry Toomey, deceased, June 1, 1887, Misc. 264, OCC-BSBC.

⁴⁷ Re – inquest of Jerry Toomey, deceased, June 1, 1887, OCC-BSBC.

done about the same as Toomey and would probably been killed as he did.”⁴⁸ Mining took risks, but as this case demonstrated, it also required trust. The pressures to produce that drove men like Toomey and Sullivan to stretch out beyond the “safety” of the timbered sections of the mine could drive fissures into that trust. Yet in these dark, shift-worked worlds, miners had to build and maintain communities of trust and solidarity across time, space, and perception if they were ever to hope to survive, let alone earn a living.

These were dark worlds, navigated by sound, experience, and continually improvised communities of work and knowledge. After the cave in, James Harlow, who was working nearby, claimed he and his partner “heard someone hollering and thought it was someone hollering time but he continued and I saw it was someone in distress, and when I got there Sullivan was holding his body up with the rock on his legs. From the looks he had been shoveling or mining a barrow out to the shoot. Know the hanging wall as in a bad condition and would look for a cave. Some of the rock fell 8 or 10 ft.” These inquests, so important as sources recording the voices and experiences of miners who left practically no written records, were also artifacts of a political process, and in almost every instance, the coroner went out of his way to make miners absolve the company of any and all liability. Thus we need to read against the grain when Harlow was recorded saying, “I think man himself his partner and the opposite partners were to blame. A man often places himself in danger when he knows it. They have plenty of time to pinpoint any mine’s danger and can go to surface for anything they want.”⁴⁹ For one, such testimony indicates that the structures of responsibility in the mines were more than just legal fictions designed to insulate companies from civil suits. Miners were responsible for both assessing risk, and taking action to deal with it, moving back and forth from surface to workface with the materials they

⁴⁸ Re – inquest of Jerry Toomey, deceased, June 1, 1887, OCC-BSBC.

⁴⁹ Re – inquest of Jerry Toomey, deceased, June 1, 1887, OCC-BSBC.

would need to survive their labors. “I was on the 300 level and deceased came up after some spikes,” testified one miner in another inquest case at the Blue Bird Mine. John Gamban, the “deceased,” “got the spikes at the 300 and got on the cage and went down as usual.” He had been working at the 1000 level (1000 feet below the surface) with his partner, but the “ground is bad and we needed some spikes and the deceased said he would go up after them.”⁵⁰ “He had gone up some time when I heard a crash. I was in the drift some 25 or 30 ft and ran out towards the shaft and saw the deceased falling. I was excited and took hold of him and carried him into the drift so that the cage might not strike him if it came down. He did not speak. His pulses were beating at the time but ceased soon.”⁵¹

A few months later, at the Burlington Mine, Thomas Hartley was killed trying to get to the surface to retrieve some supplies he needed for mining, a route he had navigated countless times before as “came up whenever he wanted anything.” A man working at the top testified he “heard 3 bells and saw deceased come up on bucket and he waved his hand at me and before I could get to him he fell off the bucket.” The shaft operator described Harley as always “a very careful man when he came up on bucket. Signals were all right and the bucket came up as usual. Saw him step back off the bucket and the next I heard some one speak and looked out and saw him wave his hand and supposed he wanted bucket raised so raised it. He staggered toward the bucket but can’t say whether to catch the rope or was falling and went to save himself. I stopped Engine and he fell down the shaft.” Hartley, killed by a miscommunication, slipped through the carefully choreographed signaling practices of bells, gestures, and shouts, falling so far and so

⁵⁰ Re – inquest of John Gamban, deceased, March 18, 1887, Misc. 247, OCC-BSBC.

⁵¹ Re – inquest of John Gamban, deceased, March 18, 1887, OCC-BSBC.

hard, “He had broken through the platform” at the shaft bottom, for the “[s]haft is so near perpendicular there is nothing to check his headway.”⁵²

Miners travelling by cage and bucket from workface to surface (or other supply stations on different levels) put their safety in the hands of station tenders and the stationary engineer running the system. Using an audible bell system, sometimes deafeningly loud to be heard over the din of blasting, drilling, and engines, station tenders at each level (every 100 feet or so) coordinated with the engineer to load and move men, materials, and ore through the mines.⁵³ Born in 1888, James Patten recalled the frustrations of working as a hoist man at the head of a Butte mine in the early twentieth century. “Regular bells?” he amusedly replied to his interviewer in 1983, no, in “those days they had a cable, rope, darn rope was wet and stretch and you didn’t know if you’d gotten one bell or three bells. You had to take a lot for granted. On those jobs they had what they called a station tender. And that man changes the cars, takes care of the timber, and he stays with the cage all the time. Well, if you’ve got a good station tender, hoist job’s not bad. But gee wiz, some of them guys, I dunno. ... the station tender can give a man a lot of misery. ... one bell to hoist, two to lower, three you’ve got men on the cage... different stations, different bells.”⁵⁴ As Thomas Hartley’s death demonstrated, this often went wrong, especially with the dangerous bucket and open cages. As such, miners fought hard to secure safer elevators and signaling systems, successfully petitioning the Montana legislature as early as 1887 to prohibit any shaft below 300 feet from operating without an iron-roofed cage.⁵⁵

⁵² Re – inquest of Thomas Hartley, deceased, June 16, 1887, Misc. 270, OCC-BSBC.

⁵³ Shovers, “Miners, Managers, and Machines,” 20-21.

⁵⁴ James Patten and Phyllis McLeod Patten interview, MHSA.

⁵⁵ Shovers, “Miners, Managers, and Machines,” 20-21.

In addition to the miners continually moving through the dangerous spaces of drifts, shafts, cages, and buckets, men and boys called “nippers,” or tool carriers, spent their days moving throughout the entirety of the mines collecting dulled or damaged hammers, drills, and candlestick holders, bringing them to the blacksmith shops at the surface and returning the repaired tools to the miners. Nippers also sometimes carried fuse and powder, like Harry W. Smith, who came to his death at the Pennsylvania Mine. Smith, although described as a “boy,” was no stranger to the mines, as few men learned the intricacies of the underground workscape better than nippers. Josiah Tiddy, a shift boss at the mine believed Smith “knew as much about the mine as I did,—that is every place.” At eight o’clock in the morning, Smith and Tiddy left the blacksmith shop together. “I was a little ahead of him,” Tiddy recounted, “and I walked into the tunnel. There is a tunnel that we have to go into, and we walked into this tunnel until we got to the manway. He had three rings of fuse with him. It was wrapped up in paper and he had a piece of string put in through the fuse and had both ends tied together, and when we got to the ladder I started to go down and he stopped and hung the fuse to his arm, so the fuse was hanging from his arm by this string and I happened to be down about thirty feet and I looked up.” Smith had cleared the first, vertical ten-foot ladder, and was coming down the steeply sloped section when Tiddy “heard the fuse rattle, just as it would if he fell back or anything like that,” and then he suddenly felt Smith smack into the side of his head. Smith had somehow slipped and tumbled down the ladder, rolling partly into the timber slide running adjacent to the manway. He had not made a sound, and while it seemed clear that Smith had fainted or been knocked unconscious, no one could offer an explanation of why. The ladder was in perfect condition, the timbermen had not sent anything down the slide, and unlike many places in the mines where the air was rendered foul and faint from dynamite blasting, “we never see any smoke or smell in around there anywhere at all. I think it is as good air there [the manway] as it is out on the surface any

place.” The local, embodied knowledge of where “good air” moved through the mines was likely the reason that they had taken that route in the first place.⁵⁶

Indeed, the work of mining could turn the air toxic. Writing to the Butte & Boston mining company, a dynamite manufacturer included a copy of a testimonial from a satisfied customer claiming, “our men are not obliged to wait for the fumes to blow away before being able to return to the quarries, as we find the fumes of your powders are not sickening, and do not bring on the severe headaches that the men always get when working in the fumes of other makes.”⁵⁷ Understandably, miners sought distance from the dynamite not only for fear of the mechanical violence, but the chemical dangers. In addition to powder makers, fuse manufacturers understood the contours of this underground spatial and chemical politics, and sought to exploit it for their own gain. “Our new slow-burning fuse averages 135 seconds to the metre, while American is about 97 seconds. You can, therefore, see how much father ours will go than the other,” wrote the Insoloid Fuse Company of Denver, Colorado to the purchasing agent of the Butte & Boston company.⁵⁸ Slow burning gutta percha fuse like this changed the timescape of the mines, distancing workers from the violence and danger of dynamite, and was apparently popular with Butte miners. “Your Insoloid fuse gives excellent satisfaction. There is no complaint and every commendation from the foremen of our mines,” the Butte & Boston Con. Mining Co. had written enthusiastically to the Insoloid Fuse Co. the year before.⁵⁹

Whatever the precise cause of Harry Smith’s loss of consciousness, it seemed that being “overcome” was a common and deadly experience for miners. Part of it may have come from

⁵⁶ Inquest on death of Harry W. Smith, July 5, 1902, ACMCR.

⁵⁷ Canaan Lime Co. to Nitro Powder Co., February 27, 1899, Box 368, Folder 10, ACMCR.

⁵⁸ J. Fitz. Brind to Clint Roudebush, October 24, 1901, Box 368, Folder 10, ACMCR.

⁵⁹ Butte & Boston Con. Mining Co. to The Insoloid Fuse Co., August 21, 1900, Box 368, Folder 10, ACMCR.

vertigo, fear, and the dark, disorienting, alien underground environment. The historian Ronald Brown vividly described the miners' descent into the mines as an embodied process of helplessness: "As the warning bell sounded, the cage dropped into the dark shaft. The only light came from lanterns affixed to the cage itself and from those passed on the way down. Likened by some miners to being buried alive, the fall produced only muted sounds, the smell of damp ground, and the rush of air; then from the pit of the stomach came the sinking feeling that accompanied the rapid fall."⁶⁰ Sometimes men would simply disappear from the cages. "I was in the cage and standing beside him, cannot tell how it happened," recounted one Anaconda miner in 1890 of his friend and partner. "He disappeared from my side somewhere before we got to the 300 foot level. It was dark and I could not see. He was going down with me and was my partner. He left the top with me. ... The cage stopped at the 400 and found him on the bonnet of the cage. He breathed once or twice, but did not say anything."⁶¹ In 1887, Patrick Harrington testified that the station tender William Murray "and I were coming up on cage together and all at once he let go and fell off the cage. Suppose he fainted. Did not notice anything wrong with him before we started and he did not speak. He was in the middle of the cage and could not get caught and pulled off. The first thing I knew was he fell. I tried to catch him but caught my knee against the wall plate and could not save him."⁶²

Miners on the day shift usually began their days at 7 or 8 in the morning. Arriving at the mine, first they donned their work clothes in the "dry" or changing and washing house. Next, they reported to the shaft collar and awaited their turn riding down a bucket or cage to their assigned level and work station. Both buckets and cages were attached to manila ropes, and were

⁶⁰ Quoted in Shovers, "Miners, Managers, and Machines," 20.

⁶¹ Re – inquest of Dennis O'Neil, deceased, October 19, 1890, Misc. 584, OCC-BSBC.

⁶² Re – inquest of William Murray, deceased, February 13, 1887, Misc. 242, OCC-BSBC.

lowered by steam-powered hoisting engines. Buckets could hold two to three men safely, while cages could hold five to seven miners. Cages dropped 500 to 800 feet per minute, or 8 to 14 feet per second for up to 3000 feet by the early twentieth century.⁶³ Those working on the bottom level went first down the shaft, then reported to the timekeeper.⁶⁴ Each day, the mine superintendent delivered quotas to the foremen, who instructed shift bosses, who were responsible for hiring a crew and then spending 12 to 14 hours underground directing the miners and muckers. Shift bosses were caught between the economic pressure of quotas, cascading down from management towards miners, and the upwards social pressures to keep the miners safe. Shift bosses usually resolved these contradictory pressures by delegating safety and responsibility to miners, who then often passed risk down to muckers.⁶⁵

Thus risk cascaded down through social relations and mine shafts, accumulating in the stopes and shafts and bodies of miners, while value in the form of ore was pushed back up through the same social relations. Muckers, however, were at the bottom the risk cascade, caught between the material dangers of mining and the full weight of the economic power structure bearing down on the mines. The “lack of discipline” of which many observers complained was not evidence of oversight or poor management, but how the mines worked for both capitalists and (some) laborers. The loose discipline and displaced responsibility was both product of and resistance to the capitalists insistence on reducing workers to interchangeable wage units. As the drive to produce came in conflict with miners struggles to stay alive and a culture of independence and pride in work, western miners sought to, in the words of Gunther Peck, “reinvent free labor” by pushing back against what they saw as eastern and English style

⁶³ Shovers, “Miners, Managers, and Machines,” 19-20.

⁶⁴ Herbert H. Mickelson interview, MHSA.

⁶⁵ Shovers, “Miners, Managers, and Machines,” 46-48.

capitalism. The wage relation in Butte was directly shaped by these politics, where most miners were hired on contracts that would pay them for the ore they produced, but always on top of the union negotiated \$3.50 daily guaranteed wage for all underground workers.⁶⁶

Until the 1890s, the only sources of light in the mines, the only means by which men could navigate the spaces and work of the mines, were candles, which companies provided at the shaft collar with other supplies.⁶⁷ And these were not just any candles. They had to be cheap enough to be purchased and provisioned in mass, hard enough not to break easily in the mines, and be able to withstand a range of temperatures from below freezing to 140 degrees without breaking or bending. In the nineteenth century, this meant that the kind of candles pioneered in the hog-light complex of the Ohio Valley, and reproduced across the industrial west. Paraffin candles made from refined petroleum were cheap enough, but too soft and melted too easily. By the time the Butte underground was being delved, candle manufacturers in Cincinnati, Pittsburgh, St. Louis, and Chicago had expanded their operations to encompass not only the fatty waste from pork packing, but of cattle and beef as well.⁶⁸ In 1881, writers for *Scientific American* visited the candle factory of Procter and Gamble in Cincinnati, by then one of the largest producers of candles in the world, describing how the vast flows of disassembled organic material were reassembled into candles through the hot, oily, smelly, steam powered vats, presses, and molds. Illustrations of the work processes showed a gendered division of labor, with men

⁶⁶ Shovers, "Miners, Managers, and Machines," 45-53.

⁶⁷ "All other supplies of whatsoever character embracing candles, powder, and such miscellaneous articles, as may be found necessary, will be furnished to said Receiver at the collar of said Berkeley Shaft, at the actual cost of same, to this Company." Contract between Butte & Boston Consolidated Mining Company and Snohomish and Tramway Mines, March 24, 1900, Box 368, Folder 16, ACMCR.

⁶⁸ Henry A. Pohs, *The Miner's Flame Light Book: The Story of Man's Development of Underground Light* (Denver, CO: Flame Publishing Company, 1995), 125-129. Pohs's work is the most thoroughly researched history and collection of underground lighting equipment that exists. It contains comprehensive catalogues, appendixes, and illustrations of candles, candlesticks, lamps, etc. from his own collection and that of other museums and collectors, as well as articles researching many aspects of the history of the use and manufacture of each of these technologies.

engaged in cooling and stacking packets of lard, rendering and distilling out the fat, cold pressing, hot pressing, tempering and molding, while women bleached the stearine in the sun, raised the candles from the molds, polished the candles by machine and by hand, and then machine stamped them with the Procter and Gamble mark. This factory alone produced 100 thousand candles each day, many of which were destined for western hard rock mines.⁶⁹ For an eight or ten our shift, miners were usually issued three candles per man.⁷⁰ Over the course of the second half of the nineteenth century, mining candles were standardized through practice and technological linkages (candlesticks) into cylinders $\frac{3}{4}$ of an inch in diameter and ranging between 6 and 9 $\frac{1}{2}$ inches in length, while 10 to 12-inch long steel and wire candlesticks consisting of a $\frac{3}{4}$ -inch candle thimble (holder), a handle, hook, and spike of varying length became the norm.⁷¹ The images below show these candles and the specially designed miner's candlesticks that every worker carried with him underground. Note the hook and spike of the candlesticks, which miners used to hang from their caps and to drive into the timbers near where they were working.

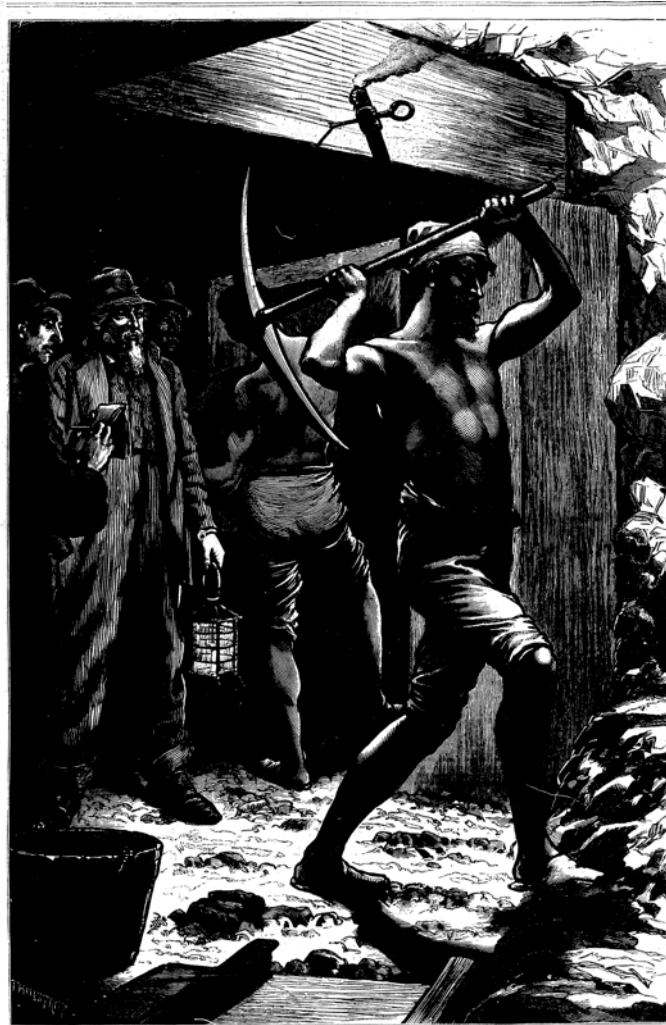


Figure 6.3. Miner's candlestick and candle, seen here next to a carbide head lamp, which replaced candles in the Butte Mines after 1912. (Photo taken by author at the World Museum of Mining, Butte, MT, May 18, 2012.)

⁶⁹ "American Industries.—No. 79. The Manufacture of Candles," *Scientific American* 45:25 (Dec. 17, 1881): 383-86.

⁷⁰ Wyman, *Hard Rock Epic*, 13.

⁷¹ Pohs, *The Miner's Flame Light Book*, 128-129, 147-197.



ACROSS THE CONTINENT.—THE FRANK LESLIE TRANSCONTINENTAL EXCURSION.—THE PARTY WITNESSED SILVER-MINERS — POKING" ONE IN THE CONSOLIDATED VIRGILIA SILVER MINE, AT VIRGILIA CITY, NEVADA.—FROM SKETCHES BY OUR SPECIAL ARTIST.—SEE PAGE 4.

Figure 6.4. Miner's candlestick driven into stull, illuminating the work of picking ore. Illustration from *Frank Leslie's Illustrated Newspaper*, March 9, 1878.

Because of the mutually reinforced success of copper and electricity, electric lighting eventually did come to the Butte underground, but only in a limited way. In 1896, the superintendent of the Mountain Con Mine wrote to the Anaconda Mine Office, with a request “for the wiring + putting in of [electric] lights on the 1100 foot level of shaft no. 2.” The problem was that “Mr. Daly ordered the sinking of this shaft continued + in consequence of having no

lights work is suspended.”⁷² Mining companies, yielding to pressure by miners, agreed to illuminate shafts and some major drifts with electricity during the 1890s, but the vast majority of the work and spaces of the mines continued to be illuminated by candlelight. In 1898, even after the introduction of at least 1000 incandescent electric lights into the Anaconda Mine and more into the Mountain Con, the Anaconda Mining Company (composed of the Anaconda group, Mountain Con group, and Bell group of mines) consumed somewhere between 2 and 2.5 million candles, at a total cost of \$41,761.49, spread across 783,435 “days worked” underground.⁷³ Given that miners worked seven days a week, with no holidays,⁷⁴ this meant that the Anaconda Company miners consumed 6000 candles every day, the equivalent of the street-lighting needs for a city.

Indeed, the hard rock mines of the west remained steady and sizeable consumers for these candles, and manufacturers fought hard to secure their business. From 1900 to 1901, W. & H. Walker, soap and candle manufacturers of Pittsburgh sent dozens of letters requesting the business of the Butte & Boston Consolidated Mining Company. Excited at the prospect of gaining such a lucrative contract, the representatives of W. & H. Walker wrote, “we are sending you by express, prepaid, a two pound sample of our Stearic Acid, 14oz 6’s, Mining Candles, which we quote in carload quantities, packed 40 sets per box, at \$4.45 per box, freight paid to Butte. We trust you will give the candles we are sending you a thorough test, as we are confident you will find them perfectly satisfactory in every way, and equal in quality to any candles you have ever used.”⁷⁵ 14oz 6’s, at 40 sets per box meant that a set of six candles weighed 14 ounces,

⁷² J. W. Coghlan to M. Donahoe, October 5, 1896, Box 5, Folder 9, ACMCR.

⁷³ General Journal A (Dec. 1896-June 1899): 4-81, MF 426, Anaconda Copper Mining Company records, 1895-1964, MHSA; “Inventory--Machinery and Supplies--Anaconda Mine--July 1st, 1895,” Box 58, Folder 6, ACMCR.

⁷⁴ Shovers, “Miners, Managers, and Machines,” 19.

⁷⁵ W. & H. Walker to Butte & Boston Consolidated Mining Co., June 15, 1900, Box 368, Folder 16, ACMCR.

so that each box contained 240 candles, and weighed 35 lbs., typical mining candles.⁷⁶ Playing different candle companies off each other for the rest of the year, and trying to break the local candle supply monopoly of the Anaconda Company, the Butte & Boston Company did succeed in lowering the price offered by Anaconda, but W. & H. Walker had not given up hope of establishing a direct contract. Sending dozens of letters, W. & H. Walker repeatedly asserted the superiority of their candles, claiming they had “spared no effort or expense to make our candles superior to all others, and that we have succeeded has been proven by most exhaustive tests [sic.] with all leading brands in hot, damp and draughty mines, and the fact that our customers are ordering repeatedly in spite of sharp competition. These tests have invariably show ours to be the hardest, to burn the longest and to give the strongest and most brilliant light, and we are determined to maintain this high standard.”⁷⁷ Despite repeated, and insistent offers by W. & H. Walker, the Butte & Boston decided to, or was strong armed into, staying with the Anaconda Copper Mining Company.⁷⁸

By this time, Anaconda, or “Amalgamated” at it was officially known, was one of the largest mining corporations in the world, and had, after Marcus Daly’s death and the famous “war of the copper kings,” been taken over by the Standard Oil Company.⁷⁹ Here, then, in the Butte underground, converged much of the energy, capital, visions, and power of the histories and geographies of the means of light that this dissertation has explored. Hog- (and cattle-) lights illuminated the work of producing copper, while the world’s largest monopoly, grown rich on

⁷⁶ Pohs, *The Miner’s Flame Light Book*, 676.

⁷⁷ W. & H. Walker to Butte & Boston Consolidated Mining Co., July 19, 1901, Box 368, Folder 16, ACMCR.

⁷⁸ Subject File 28, “Contracts,” Box 368, Folder 16, ACMCR.

⁷⁹ Punke, *Fire and Brimstone*, 60-74.

controlling kerosene fortunes, sought even greater riches in controlling the cupreous means of electricity.

The journey into and out of the mine was not only dark, dangerous, and vertigo-inducing, but a temperature shock. “While the snow fell and temperatures above ground plummeted to -20 degrees Fahrenheit,” notes the Montana historian Brian Shovers, “the miners, stripped to their waists, prepared for a day of work in a dimly lit stope where temperatures reached 90 degrees Fahrenheit.” According Shovers, a Butte “miner typically spent his entire day or night in perpetual underground darkness, laboring in a stope or raise just high enough for a man to stand erect at temperatures as high as 107 degrees Fahrenheit at 100 percent humidity.”⁸⁰ The heat of the mines made it popular winter work, but so hot was it that, “the workers would pour sweat out of their boots” by shift’s end.⁸¹ Indeed, underground the temperature never changed, and after working and sweating all day in 90 degree heat this “meant that in the winter men were hoisted, in five minutes’ time, from 90 degree mine shafts into outside air that routinely reached a brittle 40 degrees below zero. One longtime Butte resident remembers men emerging from the mines ‘covered with sweat,’ hitting the cold air and disappearing in balls of steam. Before the construction of change rooms, or dries, these men then walked home with their clothes frozen to them.”⁸² But dries were not long in coming, as with more humid and wetter mines, and sometimes hydraulic powered drills, it was important for miners to take off and wash their clothes and bodies immediately lest the highly acidic coppery water eat through the clothes and burn the workers’ skin.⁸³ Different levels had different temperatures, a fact made worse by poor ventilation

⁸⁰ Shovers, “Miners, Managers, and Machines,” 18, 23.

⁸¹ Herbert H. Mickelson interview, MHSA.

⁸² Emmons, *The Butte Irish*, 151.

⁸³ Herbert H. Mickelson interview, MHSA.

at the lowest levels. James Patten remembered that while working at the Leonard mine at the 3300 level, air came down to the 2800 and then over and out, but below “was a dead end.”

Patten later claimed, “I had to get out of there or I’d be dead. Down on the 33, sometimes that air would be down there it’d stink lord o’l mighty. ... Anyway [the boss] come down there one day and the darned air was stinkin’, and he was sniffing his nose and wrinkling his chin up.

Finally he’d come over and say, ‘where’s that air come from?!’ ... My golly it was bad.”⁸⁴

Experienced and well-connected miners thus sought out and fought for not only good pay and reliable work, but “work in the cooler mines or in the cooler shafts of the same mine.” This meant that the most powerful groups of miners, and in Butte that meant the Irish, secured for themselves what they believed to be an ecological and biological over younger, unskilled, and non-Irish immigrant workers. As the historian David Emmons argues, “Here then was another place where ‘cooperation with the more powerful’ might serve the interests of family and enclave. ... The key element, however, was active participation in in the Irish enclave ... In other words, here as elsewhere, persistence was rewarded with a chance to persist; it meant job seniority, a chance at decent housing, and, more important, the opportunity to beat the actuarial odds of a frighteningly hazardous workplace.”⁸⁵ Those outside the Irish and Cornish labor aristocracy were not so fortunate, even when protected by unions. Immigrants and unskilled miners were often paired by Irish shift bosses with more experienced miners, who made them do more dangerous work while they were isolated from knowledge and a community of work through language barriers. New immigrant miners were usually assigned as muckers, handed a shovel, and given no training or tests before being assigned a level and stope.⁸⁶

⁸⁴ James Patten and Phyllis McLeod Patten interview, MHSA.

⁸⁵ Emmons, *The Butte Irish*, 153-154.

⁸⁶ Shovers, “Miners, Managers, and Machines,” 36-37.

The spatial and environmental politics that divided the workscape of the mines along lines of class and ethnicity, however, may not always have played out the way more powerful groups had intended. As worksapes steadily advanced and meandered in pursuit of the vein, workers frequently transferred between mines in pursuit of better real wages, working conditions, work availability, and in order to preserve a right of mobility. This practice contributed to class formation and a labor-driven commodification of underground labor, knowledge, and mobility in order for workers to secure some economic power and value for themselves. However, as mobility may have collectivized certain knowledge and risks, it also dangerously thinned the environmental knowledge of the worksapes necessary to survive in the mines. This led to numerous instances where even experienced miners misread terrain that they had not had time to familiarize themselves with, killing or injuring themselves and others by causing rock falls or failing to recognize avoidable dangers.⁸⁷ Likewise, working in cooler, drier mines might have been seen as a triumph for the well-connected, more conservative Irish, but it also exposed them to a different form of environmental violence. The dry silica dust blasted into the mines by dynamite and drills slowly but steadily shredded the lung tissue of miners, causing silicosis over the long term and producing fertile environments for tuberculosis and pneumonia in the short term. Owners and corporate-controlled juries and courts blamed workers and the “foreign element” and hygiene for what was, at least in retrospect, clearly an occupational disease. Notably, silicosis and other lung diseases were particularly concentrated among the Irish, but later studies revealed this to be almost exclusively a product the fact that the Mountain Con Mine, home to the most dangerous mine atmosphere in Butte, hired only Irish workers. Here, then, was a biologically embedded unforeseen consequence of the class and ethnic politics of

⁸⁷ Shovers, “Miners, Managers, and Machines,” 40-41.

labor and space in Butte. In 1890, years before machine drills replaced hand drills, sixty three miners died of respiratory disease, around eight times more than from fall and falling rock. The slow lung-violence of hard-rock mining therefore predated machine drills, although dry machine drills that made work more efficient did worsen the slow violence.⁸⁸

Miners fought to change and adapt to the biopolitics of the workscape through unions, fraternal ethnic orders, and legislative campaigns. In Comstock in 1867 and Butte by 1900, an eight hour day was won. The Butte Miners' Union paid injured and sick miners' families \$10 a week and \$90 for funeral expenses. In 1896, the Butte Miners' Union paid out \$29,000. The Ancient Order of Hiberians, meanwhile, paid \$8 a week to sick and injured miners for up to 13 weeks, for a monthly membership fee of 50 cents. Ethnic societies for Germans, Finns, Croats, Italians, and Austrians also offered health benefits.⁸⁹ Butte was a famously strange mix of conservative and radical unionism. Nor did politics always follow ethnic lines. Institutionally, most Irish and Cornish miners in Butte represented a more conservative, trade guild association, but many of their countrymen also participated in the much more radical Western Federation of Miners, which got its start in Butte. The Butte Miners Union, the largest mining local west of the Mississippi, was strong enough to impose a closed shop on the Butte mines, an arrangement that lasted until the First World War. Accordingly, wages in western mines were high, keeping steady at around \$3.50 to \$4.00 for most of the period, a dollar or two more than could be commanded in the east or in Michigan.⁹⁰ But the emergence of enormous corporate power alongside this industrial unionism led to considerable tensions as the geography and nature of labor strained workers capacities to effectively organize. As David Emmons noted, given capitalist control of

⁸⁸ Shovers, "Miners, Managers, and Machines," 76.

⁸⁹ Shovers, "Miners, Managers, and Machines," 85-89.

⁹⁰ White, "*It's Your Misfortune and None of My Own*," 290-293; Wyman, *Hard Rock Epic*, 32-60.

dangerous mines, there were very good, very pressing structural reasons to cooperate with owners.⁹¹ Moreover, miners' politics were never just about class and safety. Like all other nineteenth century movements, miners' struggles were refracted and articulated through the powerful politics of whiteness, masculinity, and racialism that were inseparably entangled in free labor ideology, and what it meant to be an American worker or a worker in America.⁹²

What has been highlighted above could probably apply to any extractive industry—hidden and contested geographies of labor were nothing new to capitalism in 1882. Yet there was a difference between the commodification of copper and that of electric light. The former process obscured history to create exchange value in the metal. But no one was exchanging capital directly for the light produced by the bulbs. Copper as a commodity reified social relations into an inanimate object while the production of electric lights reified industrial relations into an animated automatic *system*. Through branding and material arrangements, the Edison lighting system (bulbs, wires, operating boards, dynamos, engines and all) was not an interchangeable commodity but a utility that did real work. The origin and nature of that work was disguised to control the cultural relations of consumption, and not just, as with most commodities, to reproduce the social relations of production. This systems-commodification rested, moreover, on a much more elaborate process of mystification than the artifice of the commodity form—a ruse normally sufficient for simpler, inanimate commodities. Indeed, pulsing at the heart of this web, this historical convergence of labor, energy, and matter was a spectacular incandescent performance starring lights and dreams.

⁹¹ Emmons, *The Butte Irish*, 153-154.

⁹² Peck, *Reinventing Free Labor*.

Spaces of Light

To understand these lights as performers, they first have to be considered as part of an ensemble of actors tied together through various interpenetrating spatial relations. My spatial analysis relies mostly on what the French philosopher Henri Lefebvre identified as the three forms of space: spatial practice, representations of space, and representational space.⁹³ Historian Richard White, in an attempt to further historicize Lefebvre, defines the triad more specifically so that spatial practice “involves the segregation of certain kinds of constructed spaces and their linkages through human movement.... [s]patial representation is an attempt to conceive in order to shape what is lived and perceived.... [and representational space] is space as lived and experienced through a set of symbolic associations.” White then offers his own theory or guiding principle for historians concerned with the connection of spatial practice and experience to the production of space. In short, it’s all about movement: “I don’t want to be so simplistic as to say that if space is the question then movement is the answer, but I fear that I am nearly that simple. We produce and reproduce space through our movements and the movements of goods that we ship and information that we exchange. Other species also produce space through their movements. Spatial relations are established through the movement of people, plants, animals, goods, and information.”⁹⁴ I tend to agree with White, and so I have tried to place movement at center of the narrative in each chapter. This has helped me to avoid merely cataloguing the components of this history according to Lefebvre’s types, and to instead try to keep all three in mind while reconstructing and analyzing the multiple networks and socio-ecological relationships that actively produced this dynamically contested past.

⁹³ Henri Lefebvre, *The Production of Space* (Chicago: Blackwell Publishing Limited, 1991), 37-41.

⁹⁴ Richard White, “What is Spatial History?” *Spatial History Lab* (Stanford University, February 1, 2010): 2-3.

Let us begin with the most immediate and obvious web of relations in which these lights performed, those produced together with the theater itself. In this material spatial practice, electric lights, stage actors' bodies, the built environment of the theater, and the visual organs of audience members combined to create meanings, values, and memories of each other. As electricity and people moved through and about the Bijou, stories and experiences of these lights were made, circulated and reproduced in the retelling. Moreover, many of these moving bodies were powerful and influential individuals. We know from various newspaper accounts that both Governor Long (of Massachusetts) and Mayor Green (of Boston), together with entourages of prominent military and civilian men, were in attendance for at least the first performance of *Iolanthe* (and therefore the Edison lights). A litany of other wealthy and elite figures were also seen attending, and there can be little doubt that experiences of that night would have circulated widely throughout elite (and non-elite) social networks.⁹⁵

It was a different kind of circulation and reproduction, however, one only indirectly related to the material lamps that would have staged their biggest performance to the widest audience—this was the world of press. The artifacts of this spatial production have survived remarkably well to the present, and indeed, it is largely because of these primary agents of light that I am able to write this chapter in the first place. The news reporters, like other audience members, produced memories and narratives of that evening in the Bijou with the aid of electric light and the musical and kinetic performances of the cast. While reporters, too, would have circulated experiences through direct communication, they also reproduced their stories through the far more expansive spatial web of print culture. Through telegraph and telephone, these stories could be wired, altered, reproduced, and read far from Boston, constituting what Lefebvre

⁹⁵ "The 'Bijou' Features of the Opening Night of the New Theatre," *Boston Daily Advertiser*, December 12, 1882.

calls representational spaces. In an age when few papers enjoyed national readership, spaces of the electric Bijou could nonetheless be experienced all over the country. For instance, by March, 1883, readers in New York could see graphical and textual reproductions of the Bijou as the *Daily Graphic* “herewith present two views of the new Bijou Theatre in Boston, the youngest, as well as the most elegant, of the numerous sisterhood of theatres to be found in the country.... The lighting is effected by the Edison incandescent system, which has proved an unqualified success.”⁹⁶

That it proved such “an unqualified success,” moreover, had a great deal to do with the local Boston papers that so powerfully shaped how the Bijou and its lights were experienced in discourse. The opening night of *Iolanthe* provided the impetus for scores of reporters to gather at the theater, but they became vehicles for more than just dramatic criticism. The play itself, a satire involving fairies and the House of Lords, received mixed reviews, but all agreed with the *Boston Globe* reporter who wrote of the material transformation of the new theater that any “former patron of the old Gaiety Theatre who found himself last evening within its walls for the purpose of enjoying Boston’s first hearing of Gilbert and Sullivan’s fairy opera, ‘Iolanthe,’ must have thought himself far into fairyland before the curtain rose.” In fact, the article continued, it was so “marvelous a transformation from the bleak walls, tawdry decorations and cramped accommodations of last season” that it must “have been effected, it would almost seem, by no less potent or cunning an instrument than the wand of some fairy queen.” Of course, such was only an illusion, for “to the initiated it was well known that the welcome change was due to the

⁹⁶ “The Boston Bijou Theatre,” *New York Daily Graphic*, Friday, March 9, 1883, 65.

untiring efforts of that very substantial and unfairylike gentleman, Manager Tyler, and the various persons whom he has summoned to his aid in the execution of his designs.”⁹⁷

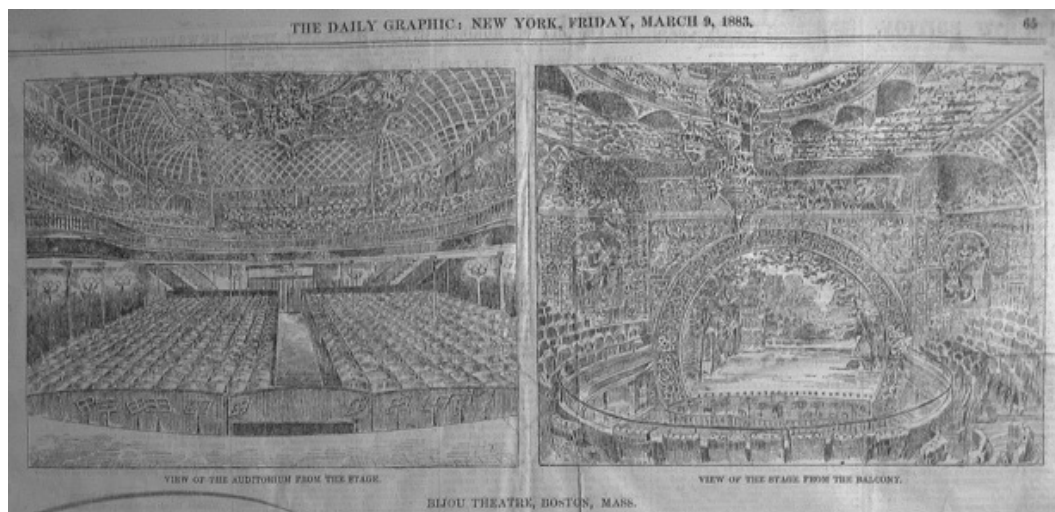


Figure 6.5. *Daily Graphic* Bijou Representation.

(Photo taken by author 12.16.09, Houghton Library, Boston Bijou Theatre Company records)

A writer with the *Daily Advertiser* expressed a similar sense of awe over this seemingly magic transformation, but provided more of a glimpse behind the scenes. Reporting on the night’s events, he recorded his own surprise that there “were few indications in the beautifully finished and furnished interior of the new Bijou Theatre, which was opened to the public last night, to show how hurriedly the workmen had completed their tasks and gathered up the implements of their trades.” Having gained admission to the theater early that day, however, he had seen how “at a late hour in the afternoon everything was apparently in inextricable confusion, a mass of rubbish lying upon the floors, and scores of carpenters, upholsterers and helpers of various grades working in desperate haste. A few hours more produced a marvelous change, almost as great as a change of scenes upon the stage, and the audience was admitted to a completed theatre, ready in all departments and respects for its comfortable reception.”⁹⁸ At least one impressive aspect of the new theater had already been in place, however, for at “a little after

⁹⁷ “The Bijou Opening,” *Boston Daily Globe*, December 12, 1882.

⁹⁸ “The ‘Bijou,’” *Boston Daily Advertiser*, December 12, 1882.

twelve o'clock the Edison lights were tried, the testing being under the personal supervision of Mr. Edison, and the result was a perfectly steady, unglaring illumination, but one strong and effective for all requirements both on the stage and in the auditorium."⁹⁹

Staging the Electric Light

Perhaps the most conspicuous example of this hiding of labor was the extraordinary degree to which electrical systems were designed to mask their histories, especially in regards to the labor and environmental relations through which they were constituted. At the opening of the Bijou, visitors and journalists were invited to inspect the electrical generator located in an adjacent structure, so that they might see (and report, as many did) how this seemingly magical system operated with only the most minimal of human labor inputs. The construction itself seemed almost like stagecraft to these reporters, who described the process as akin to a "fairylane" or a "change of scenes." They were not wrong, and they were in a position to know that. Not only did these reporters cover both construction of and performance in the theater, they also became part of a different backstage production.

Backstage is supposed to be behind the scenes, to preserve "the illusion" of the stage. Yet it is clear that Edison and the Edison Company for Isolated Lighting were directly involved in publicizing what amounted to an electrical backstage. Nearly every newspaper account of the new theater contained in practically identical language a detailed description of the plant, the underground tubing, the wiring, and the theater's switch board operation. Take, for instance, the *Daily Advertiser*, which states: "This theatre is to be illuminated by the Edison Company for Isolated Lighting, through their New England department in this city. The electricity will be furnished from a station about 550 feet from the theatre in a room especially fitted for this

⁹⁹ "The New Theatre: The Bijou, Resplendent in Beauty, to Open Tonight," *Boston Daily Advertiser*, December 11, 1882.

purpose.”¹⁰⁰ Or the *Boston Herald*, which printed: “The theatre is to be illuminated by apparatus furnished and installed by the Edison Company for Isolated Lighting through their New England department in this city. The electricity will be furnished from a station some 550 feet from the theatre, in a room especially fitted up for this purpose.”¹⁰¹ It takes no leap of imagination to presume these quotes came from a common source, whether written or spoken.

In case being a public channel for Edison circulars was not enough, Spencer Borden, the director of the New England department of the Edison Company for Isolated Lighting invited “several newspaper men” on Saturday, the 16th, to “the Bijou Theatre to witness the working of the system.” There, Mr. Borden gave the reporters a tour of the theater, demonstrating how all 644 lights operated, from the lighting arch onstage with its rows of colored lights that could be easily used to produce different light blends to lobby and auditorium lights. A *Boston Herald* reporter seemed thoroughly convinced: “The exhibition yesterday showed how perfectly each series and all the series were under control—how the lights of each could be turned down, or put out altogether, or turned on in a flash into a state of brilliant incandescence. It was indeed marvelous, and all who witnessed it could not fail to realize that Mr. Edison had completely mastered most, if not all, the difficulties in the way of rendering electricity a thoroughly pliable and practicable thing, and no doubt destined to be the illuminant of the future.”¹⁰² They were then shown the engine room, located in a basement room rented from the printers Cashman, Keating & Co., 550 feet from the Bijou.¹⁰³ This was not the first time that Edison had used the

¹⁰⁰ “The New Theatre: The Bijou, Resplendent in Beauty, to Open Tonight,” *Boston Daily Advertiser*, December 11, 1882.

¹⁰¹ “The Bijou,” *Boston Herald*, Sunday, December 10, 1882.

¹⁰² “The Edison Light,” *Boston Herald*, December 18, 1882.

¹⁰³ Receipt for \$5625, January 7, 1883 for “rent of basement...” Bought of Cashman, Keating & Co., in Orders Book, 1882-1884, Box 4, Item 24, Boston Bijou Theatre Company Records.

press to draw attention to the electrical backstage. In June, earlier that year, when the Edison company was laying wires under Pearl Street in New York to connect the houses of wealthy clients to a central generator, *Harper's Weekly* published an illustration of the wire-laying work along with an article describing the wonderful improvements these lights would bring, for such a “lamp, once screwed into the socket, needs no further attention or care until the carbon breaks,” and so safe were they that “Mr. Edison says he would be willing to break one of his lamps in the middle of a barrel of gunpowder.”¹⁰⁴

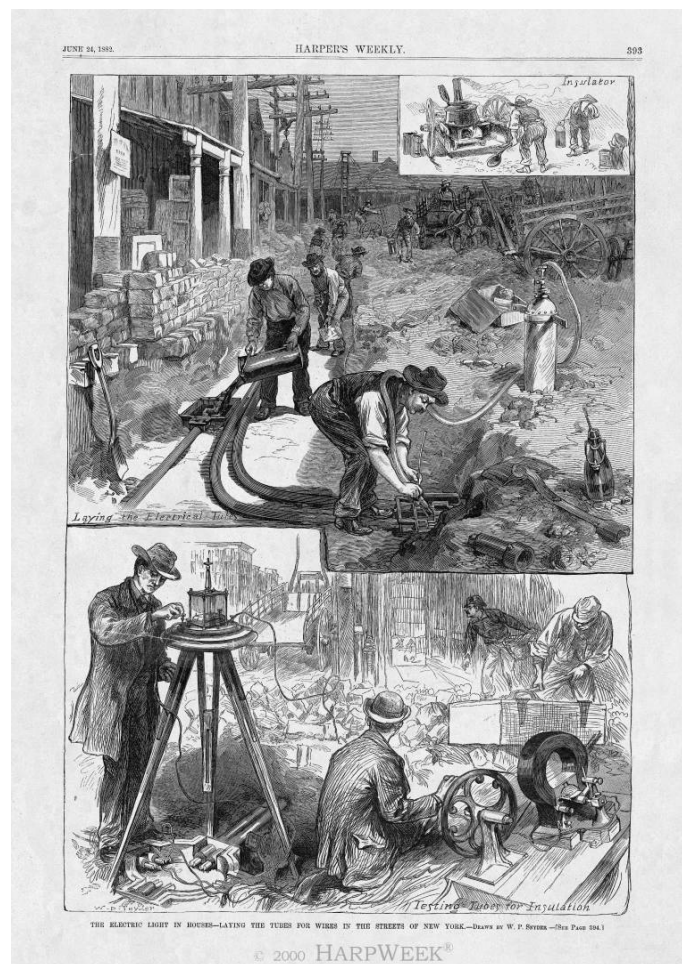


Figure 6.6. “The Electric Light in Houses—Laying the Tubes for Wires in the Streets of New York,” Drawn by W. P. Snyder, *Harper's Weekly*, June 24, 1882, 373.

¹⁰⁴ “The Electric Light in Houses,” *Harper's Weekly*, June 24, 1882, 373-374.

There was considerable tension and apparent contradiction here. Even as the Edison company seemed to show the public that it had nothing up its sleeve, to an extraordinary degree these electrical systems were designed to mask their histories, especially in regards to the labor and environmental relations through which they were constituted. By first showing journalists some of the preparatory work behind the lights, and then showing them the fully assembled system, Edison helped to enhance, rather than diminish, the sense that he had created something automatic and self-activating. What Boston journalists saw when they were shown the electrical generator was a finished product disguised as a closed-circuit system of production. They missed the wire layers, the construction crews, not to mention the factory hands. But even if they had been shown such work, as *Harper's Weekly* had, Edison was confident that the operational lights would cleanly divide the human and electrical work into past and present. Electric lights were clean, automatic, and unchanging, pure or purified of the stain of any working-class hands. Such renderings of electricity masked the human, ecological, material, temporal, and spatial webs embedded in the incandescent bulbs, the bamboo filaments, the copper wires, the steel and iron dynamos, the coal-powered steam engines. How were these spatial experiences shaped and produced? How were objectivity and visibility used to encourage a geography of selective memory and attention? How was it that industrially manufactured lamps became “*the* electric light?”

The Lights Behind The Light

Curiously, despite the numerous claims that the Bijou was the first theater in the United States to be illuminated entirely by electric light, I found numerous receipts to both the Boston

Gas Light Company and the Brush Electric Light Company (a furnisher of arc lights*).¹⁰⁵ If the theater was completely lit by Edison lights, how was this possible? Was the claim a lie? I was unable to make sense of this until reading David Sicilia's dissertation on Boston Edison in which he claimed that one of the problems with the isolated lighting plants was that they lay dormant most of the day. According to Sicilia, "since Boston Edison supplied lighting to the Bijou only during evening performances, the company routinely reimbursed the theater for the cost of the gas it used during daylight hours!"¹⁰⁶ The Edison plant only ran during evenings, so what this meant was that gas lights were being used for rehearsals and stage building. In other words, the spectacle of an electrical theater was made directly possible by the gas lights that were supposedly being rendered a dead technology. One light system was reproduced by expropriating the labor of another.

Significantly, Cashman, Keating & Co were not the only printers in Boston to have an Edison plant on their property. The same article that reported the Saturday "exhibition" also described at great length the *Herald's* recent experience using their own Edison lights. Now, not only were newspapers like the *Herald* helping to stage representational performances for these electric lights, they were using other electric lights to help materially produce the stories. Moreover, as David Sicilia noted in his dissertation, other than the Bijou, the most famous

* Arc lights were also electrical lights, but differed significantly from incandescent lamps in design and function. Arc lights worked by passing a current between two carbon rods which created a brilliant white arc between them. Arc lights, besides hissing, consumed the carbon rods in a matter of days at most and were also far too bright to look at or be used indoors. They were mostly successful in replacing gas for use as street lights or other large and open public spaces.

¹⁰⁵ Orders Book, 1882-1884, Boston Bijou Theatre Company Records.

¹⁰⁶ David Sicilia, "Selling Power: Marketing and Monopoly at Boston Edison, 1886-1929" (PhD diss., Brandeis University, 1991), 131-32.

Edison isolated plant installation in Boston was for the Post Office building—talk about lights helping to circulate dreams of more lights.¹⁰⁷

Of course, these lights were not directly manufacturing anything more than photons. It is here, in the reproduction of these lights in representational space, that we can finally begin to feel our way into the history of a intensively illuminated but largely hidden world of labor. Starting with the newspapers themselves, the article on the Edison light drew out the never-sleeping, ever-lit spaces of composing rooms only to render them clean and modernized through technology. In such spaces the Edison light could also be seen as directly competing with (or exploiting) other lights, like gas. The *Herald* article painted the outcome as a rather foregone conclusion, but also revealed a host of important human-light relations. Not only was the incandescent light in an abstract sense “much superior in illuminating properties to gas, and has none of the white, intense glare and shadow-producing qualities of the arc light, which system had been in use in the composing room and elsewhere in the building for the past two or three years,” but in specific and material human terms, these lights were fast winning allies. “The compositors are very much pleased with the new light, and regard it with the highest favor. Having to use their eyes as much as their fingers in the work of transmuting writing—and sometimes very poor and indistinct writing at that—into metallic words and sentences, they can fully appreciate a light like the incandescent, which aids them so materially in the work of deciphering ‘copy,’ and takes a good deal of the strain from their eyes. They speak of it, therefore, in terms of the warmest and most unqualified commendation, as a thing that aids them very materially in their arduous night

¹⁰⁷ Sicilia, “Selling Power,” 72-3.

working.”¹⁰⁸ Significantly, some of the most outspoken proponents of electric lights were engaged in the very labor that such automatic illumination was supposedly helping to transcend.

Furthermore, visible light was only one part of the story, for no illuminating technology, not even today’s LEDs, produces nothing but light. As the *Herald* argued, of even greater consequence was the ways that incandescent lights did *not* behave like gas, which could produce hellish workspaces through heat and consuming oxygen: “Those who have for years submitted to the torture of the brain-frying process under gaslights can tell what this heat is, and the feeling of lassitude and nervous prostration it often induces.... It need not be said, then, that the newer and better light, where each man can have a light of his own, without the heat of gas, and yet, like gas, in a measure, though far superior to it, is a great favorite, and that printers and editors who use it are unqualified in their praises of it.”¹⁰⁹ The material labor of setting type, making copy, and arranging the metallic code that would reproduce the day’s thousands of papers is something that rarely finds its way into historical narratives. Yet it is impossible to understand nineteenth-century America without that world, for newspapers are not only excellent historical sources, their circulation and interactions with readers powerfully shaped discourse and action. It is therefore far from insignificant or trivial that incandescent lights were successfully colonizing these dream workshops. As people, stories, and paper moved at a continually accelerating pace through these electrically lit buildings, they helped reproduce and circulate dreams of an automatic present and future, of a steady, perfect, pure, and predictable world.

Yet in 1882, electric light, and incandescent light even more so, constituted but a small (if growing) minority of American lights, with gas still securely entrenched in urban environments. Visions of the future, however, were much more contested, and newspapers were integral in their

¹⁰⁸ “The Edison Light,” *Boston Herald*, December 18, 1882.

¹⁰⁹ “The Edison Light,” *Boston Herald*, December 18, 1882.

formation. The *Herald* seemed confident that the triumph of incandescent lighting was already written, for “in a hygienic, as well as economic sense, this incandescent system of electric lighting seems destined to play a very important and beneficent part in the future.... Not only will crowded factories and workshops be made less risky to occupants from bad air and the danger of catching fire, but our places of public assemblage, our halls, theatres, etc., will be rendered comparatively safe, and we may no longer go to a place of amusement with the boding fear of panic and destruction bearing us company.”¹¹⁰ Such fantastical faith in technology and deterministic notions of progress suffused these electrical visions, as an interview with Edison made clear. It was an interesting paradox, that this technological worship, this idealization of labor-annihilating machines—what one historian has called the “American technological sublime”—so frequently involved a look behind the curtain.¹¹¹ As seen earlier, the Bijou lights were both spectacular and given concrete descriptions, were strange yet familiar.

Similarly, the interview with Edison juxtaposed the material with the amazing. It did so by first showing a close relationship between human and machine, one in which the machine seemed almost to threaten Edison’s organic life: “Mr. Edison being in Boston superintending the introduction of the electric lights in the Bijou Theatre, a *Herald* reporter found him Tuesday in the engine room, personally watching all the details of his ‘plant,’ where he has been a good portion of his time during the past 60 hours, having slept but from three to five hours during that time, and even neglecting to eat his meals except when they were brought and almost forced upon him.” The source of his anxiety was how new and unpredictable illuminating a theater was, something he readily admitted to the reporter. “Well, this theatre business is a new one to us,” he said. “Now, if it was a cotton factory I would feel at home,” he added, “but I acknowledge I have

¹¹⁰ “The Edison Light,” *Boston Herald*, December 18, 1882.

¹¹¹ David E. Nye, *American Technological Sublime* (Cambridge: MIT Press, 1996).

been somewhat anxious as to this experiment. We put 644 lights into this theatre, the underground conductors being 550 feet in length.” Fortunately in his view, “[e]verything worked without a hitch, and the public seemed satisfied.”

Yet for all his anxiety about the outcome at the Bijou, he was utterly confident about the future. Responding to a question about the “present electrical outlook,” Edison was proud and assured: “We are only making estimates as yet. This thing of carrying power from waterfalls to a considerable distance is going to be done very extensively in the future. It is practicable to carry 25,000 horse power 20 miles if necessary. As to running elevated railroads by electricity, it is an accomplished fact already. I have such a railroad at Menlo Park, and run passenger engines at the rate of 38 miles per hour.”¹¹² The articulation of such electric futures was more than an exercise in whimsy. By thinking seriously about production and space, these imaginings can be seen as geographic and political economic acts. Because these lights were manufactured in and from a capitalist geography of commodities and labor, their imagined futures had profound effects on patterns of investment, credit, and the prospects of constituent commodities like copper, electric dynamos, and later, tungsten. Despite Edison’s reference to waterfalls, moreover, coal remained by far the most significant fuel for the steam engines powering dynamos and thus colliers too would have felt the influence of electrical dreams even if railroads and industrial applications dominated coal commodity webs.

Conclusion

Thickening webs of copper and electrical dreams increasingly bound together and sustained Bijou and Butte. At the beginning of 1882, Butte and the Bijou were just dreams. By the end of the year they were both remarkably successful ventures. In what is perhaps only a

¹¹² “A Talk With Edison,” *Boston Herald*, Thursday, December 14, 1882.

slight exaggeration, a Butte historian has written that when “Thomas Edison turned on the Pearl Street Station in 1882 [the first Edison central station], he not only lit up the streets of New York City, he created Butte.”¹¹³ Four years later, in 1886, the relationship between the Bijou and the Edison lighting plant was transformed. The plant was moved out of the basement of Cashman & Keating to a new building at Head Place and Bumstead Court and became the first central station for Boston Edison, whose first client was the Bijou. Edison was then in competition with three other electric lighting companies in Boston—not to mention a powerful and expansive gas lighting monopoly—and the crowds circulating through the Bijou and the stories spreading through newspapers provided important competitive influence.¹¹⁴ George Tyler, the original mover behind the Bijou, had died mysteriously after a yacht race while Marcus Daly and Thomas Edison were amassing fortunes.¹¹⁵ By the summer of 1887, Boston Edison was providing electricity to five theaters, “more than any other central station in the United States.”¹¹⁶ Butte, meanwhile, now contained the world’s first and third most productive copper mines while a European speculator cornered the copper market out of visions of electrically powered wealth.¹¹⁷

As copper miners delved deeper and deeper into North American mountains, lighting their way with the iconic cap-mounted miner’s candles, their labor was building new worlds of electric light in far away cities and factories. These incandescent spaces were in turn sustained by electrical dreams and the masked geographies of labor that this chapter has tried to reveal. That this was so was never predetermined nor an inevitable result of “progress.” Specific people and actors collectively worked to create this experience of electric light, to reify these technologies,

¹¹³ Emmons, *The Butte Irish*, 23.

¹¹⁴ Sicilia, “Selling Power,” 65.

¹¹⁵ “Death of George H. Tyler,” *Evening Star*, Monday, August 18, 1884.

¹¹⁶ Sicilia, “Selling Power,” 145.

¹¹⁷ Emmons, *The Butte Irish*, 23.

and to reproduce visions of perfect individual human autonomy. Light did not illuminate this process, but it was at the heart of creating it.

Lights illuminated and cast shadows, produced as they consumed. This simple fact is especially important to keep in mind when considering electric lighting, with its clean, steady, instantaneous, and inexhaustible glow. It is too easy to be blinded to all the social and ecological processes constituting its incandescence. This was also the reason I chose to focus my attention on a theater instead of say, city streets, a factory, or a department store. The theater served as a constant reminder that electrical lighting, perhaps more than any other nineteenth-century technology, was embedded in and propagated through spectacle. It was part of a broad series of transformations that I have loosely assembled under the idea of “stage making,” or “staging.” Commodification, industrialization (including expansion of the work day), class formation, the age of spectacle (theaters, circuses, amusement parks, movie houses, vaudeville, burlesque, etc.), and the production of private and public spheres were all phenomena centered in the mid-to-late nineteenth century, and they were all absolutely integral to the processes of modern capitalism and state formation. They were also all highly staged practices that relied on, produced, and sustained a widely uneven geography of visibility.

This chapter explored how an attempt to make electric lights appear magical and labor-free to bourgeois and classless “public” audiences produced a dialectical cleavage between the spatial politics and ideologies of the future in electric cityscapes and copper camps. In other words, the processes of staging and making electric lights divided sites of consumption and sites of production, even as those processes tied the two together. The relations of producing and consuming the means of electric light created two narrowly connected industrial circuits of light, energy, and labor, one organized around copper ore, animal-based candles, and waged miners, the other around coal-powered dynamos and incandescent bulbs. One result of this electrical

dialectic was that the vast majority of human, animal, and even chemical work happened and was fought over in industrial times and spaces that grew ever more disconnected from bourgeois industrial cities, and which the staged automation of incandescent progress made even easier to ignore. Industrial labor struggles and scientific progress were not so much divergent contested historical paths as two sides of one future in which the masters of both worlds increasingly came to share an interest in allowing only one side of the coin to show publically, mystifying the other as selfish and “local.”

The “mysteries” of capital, most commonly associated with the production of surplus value, depended upon the hidden caves, troughs, and distant valleys lacing throughout a supposedly seamless and visible market geography. In the isolated mines, the factory floors, the urban custodial and infrastructure crews, and the distant plantations, the contests and practices that reproduced these “backstage” environments permitted the energies, goods, and services expropriated from them to enter into and sustain market and state geographies as if without origin, so that human relations could be materially replaced with relations between things. Electric lighting, while conspicuously present in these processes, has also been among the most under theorized and overly reified.

CONCLUSION

Formerly we ascribed creative faculty or force to the Divine Being alone... now when we look upon the wondrous contrivances and inventions everywhere contributing to our life wants... we are forced to exclaim: "Behold the expressed thought of the creator—man!" ... if you will think as you come to this place this evening how the thought of man has transformed black coal and viewless electricity into the agents which light your pathway, you will feel it scarcely irreverent to exclaim: "And man said, 'Let there be light,' and there was light."
— Senator Orville Platt, of Connecticut, before Congress, 1891.

When Senator Platt declared electric light to be the visible manifestation of the expressed thought of man, he was not merely engaging in scientific boosterism, exaggeration, or blasphemy. He was making a political statement. As demonstrated throughout this dissertation, one of the predominant tensions in the nineteenth century was the relationship between work, progress, technology, and capitalism. Questions of who or what was modern, what was progress, ran through each of the preceding chapters. Were street lamps to be for the state, the middle-class public, or the working poor? Should women work by the light of private lamps in private homes for public commerce? Were whaleships factories, and whalers wage laborers in the new national economy, or were they remnants of a colonial past? What about the slaves working in turpentine camps, coal mines, and gasworks? Could they possibly be part of modernity? Or were they merely in, but not of the progress of their times? Could hogs, swineherds, and slaughterhouse floors really be the foundations for advancement in the illuminating arts? At their core, these were questions about who should be seen, literally and discursively, in the making and illuminating of the eighteenth and nineteenth centuries.

Better to focus on the candle manufactories of Procter and Gamble, many liberal observers seemed to feel, or on the gasworks, gasometers, oil pipelines, and patents. In short, focusing on and celebrating *systems* of light seemed to relieve a deeply held anxiety shared by

many middle- and upper-class Americans in the eighteenth and nineteenth centuries Americans towards workers, the poor, non-whites, women, and immigrants. So when Senator Platt, Edison, and other electric boosters celebrated the ascendance of a world in which thought became reality, we need to read their claims not only as espousing an understanding of progress and the future by which society would transcend *work* in the abstract, but as a vision in which technology would eliminate the presence or need for the actual *workers* they grudgingly tolerated in their homes, on the streets, and in their factories.

And nothing seemed to soothe these anxieties or more convincingly conjure visions, literally and figuratively, of spaces free of work and workers than electric lighting systems. In 1917, the General Electric Company launched an advertising campaign for well-off women “to solve your servant problem” with the Edison Mazda light, “The Lamp that Lights the Way to Lighter Housework.”¹ Although historians tend to treat technologies, especially lights, as widely shared public processes, or least processes by which more advanced technologies diffuse gradually from the wealthy to the rest of society, this was almost never actually the case. Technologies like electricity were made as much into agents as markers of class power and privilege. As the historian Susan Strasser argued in her history of housework, for “the first thirty years or so, the only households that could afford electricity could also afford domestic servants. Electricity, its proponents claimed, promised freedom from the ages-old servant problem: electrical appliances could not talk back.”²

In large part, the success of Platt’s politics, measured by the fact that few would even recognize it as such, has been the reason that most of the topics I have explored here have

¹ General Electric advertisement from *McLure’s*, 1917, shown in Susan Strasser, *Never Done: A History of American Housework* (New York: Pantheon Books, 1982), 77.

² Strasser, *Never Done*, 76.

remained invisible for so long, or at least have been understood as having little or nothing to do with the history of artificial light. Indeed, almost everyone I've told about my project has assumed that by "artificial light"—which I thought meant any light that was produced through human work and relations rather than by the sun or weather—I in fact meant only that light which began with electricity. Artificial, in such rendering, means "scientific," or at least something divorced from flames. Looked at slightly differently, It might also be said to be light produced without human work, without drudgery, as "the expressed thought of man."

We are accustomed today to think of light like sunlight, as something different from fire. But before electric lighting, artificial lighting could never be considered as pure light or a substitute of sunlight; the nature of its life had always to be kept in mind. Truman Young, a Vermont dairy farmer for 92 years recalled how his father, out of fear of barn fires, "made a rule in the Fall when we'd begin to take the cattle in if we were gonna feed any hay, get up there and throw it down, before it gets dark.... 'Cause you see, they'd have to lug those kerosene lanterns up in the hay mound." And as the Youngs well knew, the Great Chicago Fire "was caused with a lady milking a cow with a kerosene lantern."³

Oral traditions warning against the dangers of exploding and volatile lights reached back farther than kerosene and Mrs. O'Leary's cow, but not into the deep past. Such warnings and such technologies were decidedly modern, nineteenth-century creations, and we should trace them to camphene rather than the invention of fire. As I have shown throughout this dissertation, the spaces and social relations produced around "progressive," systematic lighting technologies like gaslights and electricity were accompanied by and dependent on spaces and social relations produced around equally new, but far humbler portable lights like candles, animal oils,

³ Truman Young, interview by Jeremy Zallen and Ken Krantz, digital audio recording, Rutland, VT, October 16, 2010.

camphene, and kerosene. Their dangers, and the asymmetric geographies of risk they enabled, were modern formations, not ancient holdovers. Indeed, we should see the hierarchy of nineteenth century lights not in terms of stages or evolution, but as shifting chains of contemporaneous power relations.

Thinking this way, especially if we extend our analysis of the production of light to geographies of accumulation, can help us to begin cutting through the myths and mystifications that electric wizards like Edison raised to convince willing audiences of their magic. Beginning with the mutually constituted emergence of an Atlantic revolution in street lighting and the American whale fishery, my first chapter followed the energy relationships among ocean, whales, humans, landscape, and lights as they changed from about 1750 to the 1840s.

As whalers and whale ships plied the seas in search of whales and the oil that would illuminate London streets and West Indian sugar works, while greasing the gears of the transatlantic slave trade, it was always a deeply cultural process, in which knowledge, skill, stories, and identities shaped and enabled the material webs of whale light. New hands had to learn the work practices and be incorporated into social relations on board, while the networks of communication and forms of knowledge produced in pursuit of a species of whale with its own logics of migration, reproduction, and biological processes formed a global community of American whalers. Moreover, the cultural work done by whalers in pursuit of sperm whales helped to create a vision and myth of their labor that powerfully shaped how sperm candles were sold, used, and popularized. Gender too played an incredibly important role in organizing the labors, communities, and spaces constituting the geography of whale-light. Not only did the long voyages divide families for years at a time, they produced unusually gendered spaces of masculine

ships and feminine homes unlike later mine-based geographies, which typically reunited families daily and blended work and home more consistently.⁴

The geography and nature of whale-light also made it particularly vulnerable to certain forms of political economy. The outbreak of wars, especially with Britain, or when Britain was at war, had a powerful effect on the American whale fishery, given the thick entanglement of the fishery and the merchants of its products in the Atlantic economy of slavery and industry. War also fell hard on the whalers, isolated as they were in distant waters, unarmed, and filled with experienced sailors (ready-made for impressment). This same problem was also part of the reason that whaling took off so suddenly in the 19th century. It was less that technology or will was previously lacking than that the seas were still filled with pirates and privateers until the “ordering” of the waves took place under the rule of the British navy. This wider ordering and policing of alternatives to capitalistic relations, seen in enclosure and the making of an urban and migrant working class, was also entangled in the emergence of bourgeois anxieties about law and order, which helped fuel the impulse to build more and brighter street lights and public spaces. By looking at the fishery in relation to the worlds of consumption, moreover, a different story of its ultimate decline emerges than what is typically told. Instead of whale oil being outstripped by petroleum, it becomes clear that even before the fishery truly collapsed—indeed, its gross output was actually increasing—by the 1840s the revolution in light, slavery, and industry that the fishery helped launch overwhelmed its capacity to produce the means of both light and lubrication. In the end, cotton industrialization darkened the fishery long before petroleum was struck, and a new form of industrial slavery emerged to light that darkness.

⁴ Lisa Norling, *Captain Ahab Had a Wife: New England Women and the Whalefishery, 1720-1870* (Chapel Hill: University of North Carolina Press, 2000).

Recognizing the importance of camphene, and attempting to re-center it in the history of light is perhaps the most novel contribution of my dissertation, making three major interventions. First, it forces us to reconsider the relation of slavery to industry, by taking seriously a project of industrial slavery. An industrial counter-cotton project, turpentine breathed new life into eastern slavery. Projecting their power deep into piney hinterlands over steam, rail, and plank, slaveholders reproduced and reinvented the racialized carceral landscapes of plantations through a tremendously profitable extractive frontier industry. In iron factories, gasworks, coal mines, railroads, and steamships, the South was rapidly, and enthusiastically industrializing in the years before the Civil War, and it was doing so with slave labor. And even more clearly than with coal and iron, following the work and products of turpentine camps shows that slavery and free labor were not so much opposing systems, as two poles in a global capitalist process of industrialization.

Second, the turpentine camps provide an unusually fruitful opportunity for bringing the historiographies of slavery and environmental history into productive conversation. The differences in the physical space and in the nature of the labor between plantations and turpentine camps forced both slaveholders and slaves to invent new strategies for seeing and knowing the workscape, and for creating carceral and counter-carceral landscapes. Tapping the pines was isolating work that was difficult to monitor, but the extraordinary success of the turpentine industry underscored the enduring flexibility of racial slavery as an ecologically embedded spatial politics over work and movement. Yet the material nature of turpentine slavery also provided new opportunities for enslaved men to resist, and with great effort and courage they were capable of subverting (even if only slightly) the ecological structures of white power in the camps.

Thirdly, critical analysis of the spatial politics of turpentine and camphene can also help us to see the interrelations of race, gender, and class in new ways. When free workingmen

organized in antebellum cities to claim the right to a living wage and a shorter workday, it was not (as many labor historians would have it) a bottom-up politics entirely of their own making. Dressed in the mass-produced, ready-made cotton shirts and suits that clothed an emerging democratic working-class movement, white workingmen were not standing at the bottom of a capitalist social order, but at its middle. Indeed, I argue that these men were not so much *confronting* the power of capital as trying to *join* it in a scramble to divide the spoils of white patriarchy; spoils plundered from the enslaved black men who tapped the pines for turpentine and the white women who sewed clothes late into the night by the light of camphene.

Forgetting camphene has meant writing the black men who made it out of the stories of who and what really mattered to the making of nineteenth-century history. Black men working as slaves, but in an industry and place bearing little resemblance to a cotton plantation, have appeared neither similar nor different enough from the stories historians have told about industry and slavery to attract much attention. But theirs were not sideshows. They were entangled in a spatial and racial politics that at once rendered them invisible by isolating them in turpentine camps, and forced them to silently underwrite the Northern and Southern worlds of white men. And as slaves developed strategies for subverting the carceral landscapes of the camps, the masters of turpentine responded by pressing their frontier armies of enslaved light-makers into new lands, enslaving new piney frontiers. It was a spatial politics which, until the eruption of the Civil War, showed no signs of slowing its centrifugal expansion.

Meanwhile, the close relationship between slavery and the material history of light did not end with camphene, and perhaps that is the real reason camphene is so little known and written about. With camphene, no one could pretend otherwise, either then or now. Turpentine was not a product that was sometimes produced by slaves. It was a product pretty much only produced by slaves. And unlike cotton, sugar, or tobacco, no anti-slavery consumer politics

emerged around camphene, and turpentine has never featured largely in the popular imagination. Coal gas, on the other hand, has a British, slave-free history to draw on that has allowed it to fit more comfortably into progressive narratives of free labor, industry, and technological progress. It is also seen widely as a precursor to electricity, and so worthy of study. But while in Britain gas coals may have been mined, gasworks built, and gaslights burned without the help of any slave labor, such was decidedly not the case in the United States.

In the United States, while seamstresses and turpentine slaves dipped, burned, and stitched themselves together into a hidden geography of piney light, urban monopoly gasworks threaded coal-gaslights protectively (and conspicuously) in and around public and respectable spaces. Public officials and gas boosters in New Orleans and other Southern cities explicitly touted industrial slavery as the wave of a gaslit future, and proof of the compatibility, even superiority of ownable, disciplined, and interchangeable industrial slaves in an engineered modernity. Northern discourses on gaslight, on the other hand, focused on the automation and absence of human labor as what made gaslight systems at once so attractive and so contentious. It is only by attending closely to the specific nature and geography of the means of gaslight, however, that one sees the true import of slavery to the story. Most of the coal mined in the antebellum United States was mined by free miners in Pennsylvania, especially in the famous anthracite mines of the Lehigh Valley. This is the story that most historians have focused on when considering the early history of coal mining in the United States. But it was impossible to produce gas from anthracite. For that, bituminous coal was necessary, and for cities along the eastern seaboard, that meant Richmond mines. Although the Richmond mines were not one of the major coal producing regions in the antebellum United States, they were still one of the most important sources for the coals used in manufacturing coal gas. Under the Richmond basin,

slaveholders, slaves, and free miners were reinventing industrial slavery and the racial and class relations of capitalism in the process of producing the means of gaslight.

The danger caused by lights in coal mines was even more acute and far less avoidable than in subaltern domestic spaces. The invention of the so-called safety-lamp may have somewhat reduced the risk of fire-damp explosions in coal mines, but that was more than erased by the fact that these “safety lamps” were used as vehicles to place more miners in deeper, more dangerous mines. The spread of safety lamps, along with slavery, life insurance, and increasing capital investment, actually saw an *increase* in mining deaths, as they were employed to facilitate the extraction of coal, not the preservation of human life.

The nature of coal gas lights, and the material processes it was closely tied to (production of coke, iron industries) created specific values in specific kinds of coal that miners and mine owners could exploit.⁵ Gasworks facilitated the reorganization of both labor and capital around the retorts and the flame-lit factories, encouraging increasing concentrations of capital against increasingly concentrated and larger groups of gas-dependent industrial laborers. Moreover, these oxygen-hungry flames competed for air with humans even as they increased temperatures in spaces built for candles and entirely different flows of heat and air. They were also, as centralized utilities, successfully wielded by states to establish and police capitalist relations in spaces previously able to resist both state and capital (“criminal” working class and immigrant spaces like the Five Points).

This new industrial empire was making the means of light cheaper and more widely available than ever before, but even if one ignores the exploitation of humans and nature upon which this revolution was founded, life around these mineral ecologies was hardly an unqualified

⁵ Similar ideas are explored in Thomas G. Andrews, *Killing for Coal: America's Deadliest Labor War* (Cambridge: Harvard University Press, 2008).

improvement over a dark, primitive, past. Nor was it even a transcendence from organic energy. Hard rock mines in the western states relied almost exclusively on stearine candles produced under centralized industrial processes from animal fat flowing out of the extraordinary slaughter of cattle and pigs in meat-packing capitals like Chicago, St. Louis, and Cincinnati. Proctor & Gamble is only the most famous of these industrial producers of fatty lights.

In my fourth chapter, I explored how analysis of the industrialization of organic energy regimes to produce the means of light, coupled with consideration of the political economy of labor, slavery, and life could help us to rethink the way value was actually produced in capitalist social relations, and the politics that surrounded such production and distribution. The recent Marxian historiography of slavery has insistently argued that the wage relation was not the only way capital could exploit living labor to produce surplus value. Building on such arguments, and relating it to my exploration of the gendered and racialized politics of producing and consuming piney light in my second chapter, I tried to reconstruct the geography through which hogs were made into lights to demonstrate that the divisions between “work,” “labor,” “human,” and “life” were political ones. Capitalism in the industrializing Ohio Valley depended on more than wage labor. It also depended on a mass produced division of the work of life and death to usher the living work of hogs through landscape and social relations so that the spaces and times of hog death could more fully expropriate their biological work as “freely” given surplus value.

I am not trying to suggest that hogs and people are equivalent, morally, politically, or materially. What I am trying to argue is that we need to reconsider how the energy and work that capital has expropriated as its means of reproducing itself have historically been filtered through a whole range of politically charged social relations, ranging from race, property, marriage, religion, livestock holding, slavery, childhood, leisure, and more. We need to better theorize the political formations and institutions that people have built around the exchange and

expropriation of work designated through and convention as existing “outside” or “prior to” the capitalist spheres of exchange and production. What would it mean if we imagined the historical English or American working classes, or even “labor” itself, as hard-fought political alliances of men to prevent capitalists from treating them as slaves, women, children, or animals?

Indeed, whatever else light was, it was political, historical, and contingent. In other words, what we need to trace is not an arc of change, but the contests that foreclosed some futures while opening others. As I have argued in this dissertation, the most pivotal event in the social history of the means of light was the American Civil War. It was during the Civil War that the industrial slavery of turpentine and coal gas, and the terrifying prospect of a petroleum and kerosene powered industrial slavery in western Virginia were unmade. This unmaking was critical not only for what it changed (and what it kept the same) in the social and spatial relations of illuminating industrial capitalism, but for the teleology it made possible. The ideological success of Edisonian electricity, which continues to be the main source of historical blindness today, depended on a teleological narrative of progress in illumination that could credibly suggest science and machines had been freeing people from having to work. Without the precise timing and particular destruction of the Civil War, such a narrative would have been impossible, or at least much more difficult.

In my fifth chapter I examined how the contingently timed and combined onslaught of Pennsylvania petroleum and the Civil War radically reoriented the possibilities and geographies of light in North America. On the eve of war, free-labor western Pennsylvania and industrial-slavery western Virginia were both poised to capture and launch fossil fuel revolutions in power and light. This chapter explored how one of these revolutions—that based on free-labor and ownership of a mineral liquid “distilled by nature free of charge”—came to triumph over the other—that based on industrial slavery and capital-intensive coal oil—and how that triumph was

understood then and subsequently as an inevitable stage of “progress.” As military clashes interrupted and destroyed turpentine camps, whaleships, and southern coal mining, the reservoirs of American light shifted their center of gravity markedly northward and westward. A period of widely increased access to illuminants, it was also a time of deepening monopoly control over the means of light. Here I explored the centrality of political economy and organized violence to any true understanding of the histories of labor, energy, and technology.

New technologies reorganized the possibilities of energy and social relations, and new lights were often used to extend and further capital’s control over labor. Take for instance the social spaces of some southern European immigrant workers in New York: “When finally, after much delay, work on Jefferson Park was begun, those of us of the Aviglianese colony moved to tenements several blocks away. Instead of kerosene lamps, we now had gas light and a gas stove and a meter which kept us constantly scurrying for quarters. In the middle of a meal or at night while I was reading, the gas would lower under a boiling pot of spaghetti or the light would dim, and the meter would have to be fed. My father said it was like having an extra mouth in the family.”⁶ And gas lights helped to do more than reorganize spaces of consumption and imbue definite exchange values in domestic practices that had previously functioned largely parallel to the money economy. These extra mouths also meant extra “waste,” and here the nature of lights mattered greatly. As explored in the final chapter, one of the most celebrated qualities of electric lights was that, unlike gas, they did not consume air, produce fumes, or raise temperatures in the rooms in which they shone. The late-nineteenth century class divisions between gas and the more-expensive electric lights, then, were more than markers of status. They were actively

⁶ Leonard Covello and Guido D'Agostino, *The Heart is The Teacher* (New York: McGraw-Hill, 1958), 46.

productive of ecological inequalities, with gaslights poisoning working-class air while electric bulbs merely illuminated the spaces of the wealthy.

The history of electrification is typically separated from that of oil, burning fluids, candles, and gas, due to notions of technological progress. The establishment of real regional and national grids along with the increased involvement of state and federal governments in transforming electric light into a public utility certainly did present a change from the political economies of kerosene and gas-light. Electric lighting, however, was around for decades before anything resembling a grid or a universal public lighting utility can be said to have emerged. Indeed, before the end of the First World War, the political economy of electric light had much more in common with the corporate American empires of rail, coal, and oil than it did with the massive federally funded electricity projects of the New Deal. In trying to carve out little kingdoms of their own in a rail-coal-petroleum complex, electric boosters worked tirelessly to sell their lights as the inevitable and glorious future. That many of these late-nineteenth-century electric visions seemed to come true should not, however, be taken as proof that the boosters were correct. From about 1880-1920, there was not so much an explosion of electric light as there was a proliferation of incandescent theaters, in which “automatic” electric bulbs were cast as the protagonists of a bright, clean, safe, labor-free, perfectly mastered future. Indeed, new kinds of gas lights actually spread much more rapidly than electric lights for most of this period, a fact usually credited to the gas industry’s last, desperate play before being overtaken by the clear superiority of electricity once it had achieved economies of scale.⁷

These modern, brilliant spaces were indeed productive of the kinds of liberal subjectivities that Chris Otter identifies as originating in Victorian cities, but by situating these lights

⁷ Peter C. Baldwin, *In the Watches of the Night: Life in the Nocturnal City, 1820-1930* (Chicago: University of Chicago Press, 2012), 158-159.

ecologically and socially, I hoped to expand the discussion beyond subjectivity to include new geographies of capital and state power. This new order depended upon copper and the manufacture of massive electrical generators. Moreover, it was not only important how these luminous ecologies lived, but how they died and were recycled by capital and nature. Unlike spaces made of whale oil, the landscapes of copper and coal exhausted the land and poisoned the earth with toxic chemicals that could and did accumulate in living plants, animals, and human bodies. Indeed, the abandoned copper mines of Butte, Montana form the largest superfund site in the United States, and copper smelting continues to be one of the most toxic processes in an electric ecology.⁸

That lights are today understood in terms of abstract energy, as parts of automatic systems rather than as historically produced and reproduced contingent webs of work, nature, and energy is largely an artifact of the gilded age. Light was not only divided from heat, it became a reified thing instead of a dynamic process. Lights, along with most of the artificial ecology became reified as a second nature even more incomprehensible and alienating than that to be found in “the wild” or national parks for most middle-class Americans. Environmental historians have incisively questioned middle-class values that seek to deny all knowledge of nature through labor, but the same might be extended to the technological sublime.⁹

When I first saw that Bijou light in the archive, I lamented that it was dead and dark, wondering what it would have looked like if plugged in. Only later did I realize that I should have started by asking how the bulb could have been made to shine in the past at all, not

⁸ For more on the twentieth century environmental history of copper and electrification see Timothy J. LeCain, *Mass Destruction: The Men and Giant Mines that Wired America and Scarred the Planet* (New Brunswick: Rutgers University Press, 2009).

⁹ See, for instance, Richard White, “‘Are You an Environmentalist or Do You Work for a Living?’: Work and Nature,” in ed. William Cronon, *Uncommon Ground: Rethinking the Human Place in Nature* (New York: W. W. Norton & Company, 1995), 171-185.

presuming that it would have. Recovering past appearances and experience is certainly worthwhile, but if we forget to explore how appearances came to be historically, we risk reproducing the myth of magical technologies. A collective failure of imagination has allowed technologies to mask histories and social relations, to allow lights to appear as “the expressed thought of man,” to make us feel like little gods. If you take away nothing else from this dissertation, I hope the next time you flip a switch to turn on a light that you pause a second and consider the histories and social relations that made that action possible.

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